

Transport Impact Assessment ***Avec La Terre, Portion 11 of Farm 1426, Paarl***

Report Status – Revision 1
Date - October 2022



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SUMMARY SHEET

Report Type	Transport Impact Assessment
Title	Avec La Terre, Portion 11 of Farm 1426
Location	Paarl
Client	Future Megawatt
Reference Number	ITS 4493
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Date	October 2022
Report Status	Revision 1
File Name	G:\4493 TIA Avec La Terre, Paarl\12 Reports\Issued\4493_TIA Avec La Terre Paarl_Report_Rev 1_TCN_2022-10-25.docx

It is herewith certified that this Traffic Impact Assessment has been prepared according to requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

TABLE OF CONTENTS

1	Purpose of Study.....	1
2	Locality.....	1
3	Land Use.....	1
4	Existing Roadways.....	1
5	Existing Access	2
6	Study Intersections (existing control)	2
7	Scenarios Analysed	2
8	2022 Existing Traffic Conditions <i>Scenario 1</i>	3
9	Approved Developments/ Latent Rights.....	3
10	2027 Background Traffic Conditions.....	4
11	Trip Generation Rates	4
12	Development Trips.....	5
13	Trip Distribution	5
14	Development Access and Queueing Analysis	5
15	2026 Total Traffic Conditions (<i>Scenario 3</i>).....	7
16	2027 Total Traffic Conditions (<i>Scenario 4</i>).....	8
17	2028 Total Traffic Conditions (<i>Scenario 5</i>).....	8
18	Non-Motorised Transport.....	9
19	Public Transport.....	9
20	Parking	10
21	Future Road Planning.....	10
22	Street Lighting.....	11
23	Refuse Removal	11
24	Findings & Recommendations	11
	REFERENCES.....	14

REPORT - SUMMARY TABLE

This transport impact assessment is reported only in a summary table instead of a lengthy report to assist review and interpretation of the results. This summary table includes all the relevant information that is normally contained in a report. It should be sufficient for review and interpretation of the expected transport impacts as well as the comprehension of the required measures to mitigate the transport impact. If any more detail is required please contact the authors.

ANNEXURES

- Annexure A: Figures
- Annexure B: Tables
- Annexure C: Photos
- Annexure D: Queueing Analysis
- Annexure E: Right turn lane warrants

LIST OF FIGURES

Figure 1: Locality Plan	1
Figure 2: Site Development Plan.....	1
Figure 3: 2022 Existing Lane Configuration and Traffic Control	1
Figure 4: 2022 Existing Traffic Conditions (Scenario 1).....	1
Figure 5: Approved, In-Process and Planned Developments in the Paarl South Area	1
Figure 6: Expected Approved Development Trips	1
Figure 7: 2027 Background Lane Configuration and Traffic Control	1
Figure 8: WCG Upgrades along MR201 (R301)	1
Figure 9: 2027 Background Traffic Conditions (Scenario 2).....	1
Figure 10: 2026 Expected Phase 1 & Phase 2 Development Trips and Distribution	1
Figure 11: Planned Access Spacing	1
Figure 12: 2026 Total (Phase 1 & Phase 2) Lane Configuration and Traffic Control.....	1
Figure 13: 2026 Total Traffic Conditions (Scenario 3).....	1
Figure 14: 2027 Expected Phase 3 & Phase 4 Development Trips and Distribution	1
Figure 15: 2027 Total Traffic Conditions (Scenario 4).....	1
Figure 16: 2028 Total (Phase 5) Lane Configuration and Traffic Control.....	1
Figure 17: 2028 Expected Phase 5 Development Trips and Distribution	1
Figure 18: 2028 Total Traffic Conditions (Scenario 5).....	1

LIST OF TABLES

Table 1: Trip Generation for the Proposed Development	1
Table 2: Expected Development Trips	1

ABBREVIATIONS

COTO	Committee of Transport Officials
LOS	Level of Service
NMT	Non-motorised Transport
TIA	Transport Impact Assessment
V/C	Volume to Capacity Ratio
WCG	Western Cape Government

<h2 style="text-align: center;"><i>Transport Impact Assessment</i></h2> <p style="text-align: center;"><i>Avec La Terre, Portion 11 of Farm 1426, Paarl</i></p>	
1 Purpose of Study	Future Megawatt are proposing to develop a mixed-use development, referred to as Avec La Terre, in Paarl south. This report documents the transport impact assessment prepared for the proposed development.
2 Locality	Location - Portion 11 of Farm 1426, Paarl This development is bordered by Schuurmansfontein Road (DR1095) to the north and the R301 (MR201) to the east. See Figure 1, Annexure A for the Locality Plan.
3 Land Use	<p>Existing Use: Farming agriculture</p> <p>Proposed Use: The following land uses and extents are proposed:</p> <ul style="list-style-type: none">• Single Residential 216 units• Commercial 2.7 ha<ul style="list-style-type: none">○ Office 200 m²○ Retail 200 m²○ Hotel 40 rooms○ Sectional Title Housing 100 units <p>The development will be constructed in five phases with the commercial portion being the fifth and final phase of the development.</p> <p>Refer to Figure 2, Annexure A for a layout of the Site Development Plan.</p>
4 Existing Roadways	<p><u>Schuurmansfontein Road</u>: A Class 4 Provincial Divisional Road (DR1095) consisting of one lane per direction. This road has no shoulders or sidewalks.</p> <p><u>R301</u>: A Class 2 Provincial Main Road (MR201) consisting of one lane per direction, no shoulders, no sidewalks, no street lighting and a posted speed limit of 100km/h in the vicinity of Schuurmansfontein Road.</p> <p>Refer to Figure 1 and Figure 2 in Annexure A for the locations of these roads relative to the proposed development.</p>

<p>5 Existing Access</p>	<p>Portion 11 of Farm 1426 currently gains access from the western side of the R301 (MR201) approximately 165m south of Schuurmansfontein Road. The existing access will be closed in the future once the property develops as current spacing to Schuurmansfontein Road does not meet the access spacing requirements provided in the Access Management Guidelines of the Western Cape Government.</p> <p>Section 15 of this report discusses proposed future accesses.</p>
<p>6 Study Intersections (existing control)</p>	<p>Int. 1: R301 (MR201) / Lustigan Road (DR1110).....[Traffic Signal] Int. 2: R301 (MR201) / Kliprug Minor Road (OP5255).....[Roundabout] Int. 3: R301 / Schuurmansfontein Rd (DR1095).....[Priority Stop Control] Int. 4: Schuurmansfontein Rd/ Dev Access 1.....[Future Intersection] Int. 5: Schuurmansfontein Rd / Dev Access 2.....[Future Intersection]</p> <p>Refer to Figure 3, Annexure A for the locations, lane configurations and control devices at the study intersections.</p>
<p>7 Scenarios Analysed</p>	<p>The following scenarios were analysed:</p> <ul style="list-style-type: none"> • Scenario 1: 2022 Existing Traffic conditions - weekday AM and PM peak hour operations <i>based on existing counted traffic volumes and intersection lane configurations and traffic control devices</i>. Traffic counts were conducted on a weekday in July 2022 during the morning (6:00 to 9:00 AM) and evening (4:00 to 6:30 PM) peak periods and peak hours within these periods were identified for use in the analysis. • Scenario 2: 2027 Background Traffic conditions – Calculated as follows: <ul style="list-style-type: none"> ○ 2022 Existing Traffic Volumes adjusted with a growth rate of 3% per annum. This is to consider potential traffic growth due to developments currently in the evaluation process with approval still pending. ○ Plus, the trips from other approved developments in the area. Refer to Section 10 • Scenario 3: 2026 Total Traffic conditions (2022 Existing Traffic volumes adjusted with a growth rate of 3% over four years plus the approved development trips plus the Avec La Terre Development Phase 1 and Phase 2 Development Trips.) • Scenario 4: 2027 Total Traffic conditions (Scenario 2: 2027 Background Traffic volumes plus the Avec La Terre Development Phase 1 to Phase 4 Development Trips.)

	<ul style="list-style-type: none"> • Scenario 5: 2028 Total Traffic conditions (2022 Existing traffic volumes adjusted with a growth rate over six years, plus the approved development trips plus the Full Avec La Terre (Phase 1 to Phase 5) Development Trips)
<p>8 2022 Existing Traffic Conditions <i>Scenario 1</i></p>	<p>The 2022 Existing Traffic conditions are based on existing intersection geometries, controls and counted traffic volumes. Traffic counts used in the analysis were done on Thursday, 28 July 2022.</p> <p>Based on site observations and the existing traffic capacity analysis results, all the study intersections currently operate at acceptable Levels-Of-Service (LOS) and delay.</p> <p>See Figure 3, Annexure A for the Existing Lane configuration and controls as well as Figure 4, Annexure A for the Existing Traffic conditions summary.</p>
<p>9 Approved Developments/ Latent Rights</p>	<p>The following approved and in-process developments were included as part of the future traffic scenarios:</p> <ul style="list-style-type: none"> • Pearl Valley 2 In Process / Partially developed • La Vue 1 In Process / Partially developed • La Vue 2 In Process / Partially developed • The Acres In Process/ Construction Started • Idille Approved – Construction not started • De Hoop Approved – Construction not started. <i>For analysis purposes it was assumed that at least 20% of this development will be completed by the year 2027. Construction for this development haven't started and it is unlikely that this development covering approximate 283ha will be fully developed by the year 2027.</i> • River Farm Construction in process. • Wildepaarde Construction in progress / Partially developed <p>Most of the trips from these developments will distribute northward along the R301 (MR201) and the R45 (MR191) toward Paarl / Wellington and Cape Town areas.</p> <p>Refer to Figure 5, Annexure A for the location of these developments and to Figure 6, Annexure A for the trips expected as part of the approved developments during the background and total traffic horizon years.</p>

<p>10 2027 Background Traffic Conditions</p>	<p>The 2027 Background Traffic volumes were calculated by applying a three (3) percent growth rate per annum over a five-year period to the existing counted traffic volumes, plus the trips from the approved and in-process developments.</p> <p>The geometry used in the analysis is based on the existing geometry with the dualling upgrades planned along the R301 (MR201) between the N1 to Kliprug Minor Road. These upgrades include:</p> <ul style="list-style-type: none"> • Dualling along the R301 (MR201) from the N1 through the Kliprug Minor Road intersection. • The Kliprug Minor Road / R301 (MR201) intersection will change from a roundabout to side road stop T-junction with the following geometry: <ul style="list-style-type: none"> ○ Separate right and left turning lanes on the Kliprug Minor Road. ○ Two through lanes and dedicated left and right-turn lanes on the north and southbound approaches. ○ <i>Note that for analysis purposes it was assumed, and it is expected that a traffic signal would be warranted at this stage due to the number of trips expected. Therefore, the Kliprug Minor Road / R301 (MR201) intersection were analysed as a traffic signal during the background and total traffic scenarios.</i> • During the site visit it was observed that setting out of these works has started and it is expected that construction will commence soon. <p>From the Background Traffic capacity analysis results, it is evident that the study intersections are projected to continue to operate at acceptable Levels-Of-Service (LOS) and delay with the upgrades currently being implemented by the Western Cape Government.</p> <p>Refer to Figure 7, Annexure A a summary of the lane configuration and control used in the analysis, Figure 8, Annexure A for a layout indicating the extent of dualling planned at the Lustigan and Kliprug Minor Road intersections and to Figure 9, Annexure A for a summary of the expected 2027 Background Traffic operations.</p>
<p>11 Trip Generation Rates</p>	<p>Trip generation rates obtained from <i>The Committee of Transport Officials Trip Data Manual (TMH17 - COTO 2013)</i> were used to estimate development trips for the proposed development. Per the TMH17 guidelines, the standard trip generation rates were adjusted to compensate for the mixed-use nature of the proposed development and for public transport usage.</p>

	<p>The trip generation rates are summarised below:</p> <table border="1" data-bbox="646 237 1352 453"> <thead> <tr> <th>Land Use</th> <th>A.M. Rate</th> <th>P.M. Rate</th> </tr> </thead> <tbody> <tr> <td>Residential (Single Dwelling)</td> <td>1.0 / unit</td> <td>1.0 / unit</td> </tr> <tr> <td>Office</td> <td>2.10 / 100m²</td> <td>2.10/100m²</td> </tr> <tr> <td>Retail</td> <td>4.01 / 100m²</td> <td>22.70 / 100m²</td> </tr> <tr> <td>Hotel</td> <td>0.5 / Room</td> <td>0.5 / Room</td> </tr> <tr> <td>Residential (Sectional Title)</td> <td>0.75 / Unit</td> <td>0.75 / Units</td> </tr> </tbody> </table> <p>See Table 1, Annexure B for a summary of the trip generation rates as well as reduction factors used in this analysis.</p>	Land Use	A.M. Rate	P.M. Rate	Residential (Single Dwelling)	1.0 / unit	1.0 / unit	Office	2.10 / 100m ²	2.10/100m ²	Retail	4.01 / 100m ²	22.70 / 100m ²	Hotel	0.5 / Room	0.5 / Room	Residential (Sectional Title)	0.75 / Unit	0.75 / Units
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Residential (Single Dwelling)	1.0 / unit	1.0 / unit																	
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Hotel	0.5 / Room	0.5 / Room																	
Residential (Sectional Title)	0.75 / Unit	0.75 / Units																	
<p>12 Development Trips</p>	<p>Based on the trip generation rates above, the development is estimated to generate the following Net-New peak hour vehicle trips:</p> <table border="1" data-bbox="646 688 1071 831"> <thead> <tr> <th>Peak Hour</th> <th>In</th> <th>Out</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>A.M.</td> <td>84</td> <td>214</td> <td>298</td> </tr> <tr> <td>P.M.</td> <td>221</td> <td>112</td> <td>333</td> </tr> </tbody> </table> <p>See Table 2, Annexure B and Figure 10, Figure 14 & Figure 17 for the estimated development trips.</p>	Peak Hour	In	Out	Total	A.M.	84	214	298	P.M.	221	112	333						
Peak Hour	In	Out	Total																
A.M.	84	214	298																
P.M.	221	112	333																
<p>13 Trip Distribution</p>	<p>The following trip distribution was used:</p> <ul style="list-style-type: none"> • 65% of trips to / from the north along R301/ MR201 toward Paarl • 15% of trips to / from the east along Lustigan Road • 20% of trips to / from the south along the R301 / MR201 toward Franschhoek. <p>See Figure 10 for the expected trip distribution destinations.</p>																		
<p>14 Development Access and Queueing Analysis</p>	<p>Development Access and Spacing:</p> <p>Number of development accesses: Two (2)</p> <p>The existing access from the R301 (MR201) to Portion 11 of Farm 1426 will be closed as part of the proposed development. This access is located 165m south of the Schuurmansfontein Road / R301 intersection. The existing spacing does not meet the Western Cape Government's Access Management Guidelines 305m recommended minimum requirement between two unsignalized full intersections along a Class 2 road in a semi-rural roadside development environment.</p> <p>Access is therefore recommended from Schuurmansfontein Road as follows:</p> <ul style="list-style-type: none"> • <i>Access 1</i> – This will be a full unsignalized intersection from Schuurmansfontein Road at a location approximately 490m west 																		

of the R301 (MR201) intersection. This access will be constructed as part of the first four phases of the development and will provide access mainly to the residential component of the development. The access will consist out of two inbound lanes, one for residents and one for visitors, and two outbound lanes. It is recommended that one lane have a minimum width of 4m at the boom control to accommodate emergency vehicles at the access.

- **Access 2** – This will be a full unsignalized intersection form Schuurmansfontein Road at a location approximately 240m west from the R301 (MR201) intersection. This access will be constructed as part of the fifth and final phase of the development and will provide access mainly to the commercial component of the development.

Schuurmansfontein Road is classified as a Class 4 Divisional Road located in a semi-rural / rural environment. Based on the Access Management Guidelines of the Western Cape Government the access spacing requirements that apply are as follows:

- The required access spacing between unsignalized full accesses along a Class 4 Road, on the approach to a Class 2 Road, in a semi-rural environment should be 225m. As indicated on **Figure 11** the access spacings between Access 2 and the R301 / MR201 intersection would be 240m and therefore adequate.
- Access spacing between two accesses along a Class 4 Road, in a semi-rural environment should be 145m. As indicated on **Figure 11** the access spacing between Access 1 and Access 1 along Schuurmansfontein would be 250m and is therefore adequate.

Shoulder Sight Distance:

During the site visit photos were taken along Schuurmansfontein Road from the planned access positions. It can be seen from the photos that Schuurmansfontein is a straight road with no vertical alignment and that the available sight distance that would be achieved when the accesses are constructed would be longer than the 120m required. This is if sight lines be kept clear from boundary walls and trees.

Refer to **Photo 6** and **Photo 7** in **Annexure C** for a view of the alignment of Schuurmansfontein Road from Access 1. Refer to **Photo 4** and **Photo 5** in **Annexure C** for a view of the alignment of Schuurmansfontein Road from Access 2.

	<p>Queueing Analysis:</p> <p>Access 1 will have a security access control point. Based on the trips expected as part of the full development a stacking space with a minimum space of 30m, or storage of up to 4 passenger vehicles, is required. Refer to Annexure D for the queueing analysis.</p> <p>However, it is recommended that a stacking space of 50m be provided from Schuurmansfontein Road to the development access to accommodate the movement of refuse trucks and U-turns of motorist entering the access by mistake.</p>
<p>15 2026 Total Traffic Conditions <i>(Scenario 3)</i></p>	<p>The 2026 Total Traffic (Scenario 3) volumes were calculated by adding the expected Avec La Terre Development Phase 1 & Phase 2 development trips to the expected background traffic volumes.</p> <p>The geometry is based on the existing geometry, the first Avec La Terre Development Access (Access 1) and with the dualling upgrades planned along the R301 (MR201) as discussed in Section 10 above.</p> <p>Based on the Total Traffic (Scenario 3) capacity analysis results, it is evident that all the study intersections are projected to continue to operate acceptably with the existing geometry plus the upgrades dualling upgrades planned along the R301 (MR201).</p> <p>Therefore, no upgrades are recommended as part of the first two phases of the proposed development to mitigate or improve traffic operations from a capacity point of view.</p> <p>However, based on the WCG right-turn lane volumes-based warrants a southbound right-turn lane will be warranted at the Schuurmansfontein Road / R301 (MR201) intersection. Refer to Annexure E, Image 1 for the right turn lane warrants as obtained from the Access Management Guidelines of the Western Cape Government.</p> <p>Accordingly, a southbound right turn lane should be provided at the intersection of Schuurmansfontein Road / R301 (MR201) in accordance with WCG design standards is recommended in conjunction with the first two phases of the proposed development. The projected 90th percentile vehicle queue for the movement is 1 vehicle during the peak hours.</p> <p>Refer to Figure 10, Annexure A for the development trips expected as part of the first two phases of Avec La Terre, Figure 12, Annexure A for the recommended upgrades as part of Scenario 3 and Figure 13, Annexure A for the traffic operations expected as part of the 2026 Total Traffic Scenario 3 operations and</p>

<p>16 2027 Total Traffic Conditions <i>(Scenario 4)</i></p>	<p>The 2027 Total Traffic conditions (Scenario 4) volumes were calculated by adding the expected Avec La Terre (Phase 1 to Phase 4) development trips to the 2027 Background traffic (Scenario 2) volumes.</p> <p>The geometry used in the analysis of this scenario is based on the following:</p> <ul style="list-style-type: none"> • The existing lane configuration and geometry <i>plus</i>, • The dualling upgrades planned along the R301 (MR201) <i>plus</i>, • The southbound right-turn lane recommended at the Schuurmansfontein Road / R301 (MR201) intersection <i>plus</i> • The first Avec La Terre Development Access (Access 1) planned as part of the first four phases of the development. <p>Based on the Total Traffic conditions (Scenario 4) capacity analysis results, it is evident that all the study intersections will continue to operate acceptably with the geometry as listed above. Therefore, no upgrades are recommended as part of the third and fourth phases of the development.</p> <p>Refer to Figure 14 for the development trips expected as part of the third and fourth phases of the Avec La Terre development and Figure 15 for the traffic operations expected as part of the 2027 Total Traffic conditions (Scenario 4) operations.</p>
<p>17 2028 Total Traffic Conditions <i>(Scenario 5)</i></p>	<p>The 2028 Total Traffic conditions (Scenario 5) volumes were calculated by adding the full Avec La Terre (Phase 1 to Phase 5) development trips to the Background traffic volumes.</p> <p>The geometry used in the analysis of this scenario is based on the following:</p> <ul style="list-style-type: none"> • The existing lane configuration and geometry <i>plus</i>, • The dualling and traffic signal upgrades planned along the R301 (MR201) <i>plus</i>, • The southbound right-turn lane recommended at the Schuurmansfontein Road / R301 (MR201) intersection <i>plus</i> • The first Avec La Terre Development Access (Access 1) planned as part of the first four phases of the development. • The second Avec La Terre Development Access (Access 2) planned as part of the fifth and final phase of the development. <p>Based on the 2028 Total Traffic conditions (Scenario 5) capacity analysis results, it is evident that most of the study intersections will continue to operate acceptably with the geometry as listed above.</p>

	<p>Refer to Figure 16 for an illustration of the lane configuration and intersection controls used as part of the analysis, Figure 17 for the development trips expected as part of the fifth phase of the Avec La Terre development and Figure 18 for the traffic operations expected as part of the 2028 Total Traffic Scenario 5 operations.</p>
<p>18 Non-Motorised Transport</p>	<p>Existing Facilities: There are currently no pedestrian or cyclist facilities along Schuurmansfontein Road and the R301 (MR201) in the development vicinity.</p> <p>Site observations: No pedestrians were observed walking along the R301 (MR201) in the site vicinity. It was observed that a few workers walked along Schuurmansfontein Road and wait in the north-western quadrant of the Schuurmansfontein Road / R301 (MR201) intersection for bakkies to pick them up. A few cyclists were observed cycling along the R301 (MR201) in the morning and afternoon.</p> <p>Recommended Facilities: It is not expected that the development will generate cyclist or pedestrians along the R301 or Schuurmansfontein Road. Therefore, no upgrades are recommended along the external road network as part of the proposed development.</p> <p>The site development plan indicates that sidewalks would be provided on-site along the internal road.</p>
<p>19 Public Transport</p>	<p>Existing Facilities: There are currently no public transport facilities in the development vicinity.</p> <p>Site observations: It was observed that the bus and mini-bus taxi volumes are very low in the development vicinity. Traffic counts indicates that the percentage of public transport trips in the site vicinity along Schuurmansfontein Road and the R301 (MR201) varies between 1 to 2 percent during the peak hours</p> <p>Recommended Facilities: It is expected that both the residential and commercial component of the development will generate a few public transport trips. These trips would be accommodated as follows:</p> <ul style="list-style-type: none"> • Residential component – Mini-bus taxis would be able to enter Access 1, make a u-turn and use the refuse bay for dropping of commuters. • Commercial zone – a drop & go area would be provided along the roundabout planned at the amenities area. Mini-bus taxis can make use of this area to drop of commuters. <p>No additional upgrades are recommended.</p>

<p>20 Parking</p>	<p>Off-Street parking should be provided on-site based on the following minimum parking rates as obtained from the Drakenstein Municipality Zoning Scheme By-Law, February 2018:</p> <table border="0"> <thead> <tr> <th style="text-align: left;">Land Use</th> <th style="text-align: left;">Parking Rate</th> </tr> </thead> <tbody> <tr> <td>Residential (Single Residential)</td> <td>1 bay / dwelling</td> </tr> <tr> <td>Residential (Sectional Title)</td> <td>1 bay / dwelling + 0.5 bays / dwelling for visitors</td> </tr> <tr> <td>Office</td> <td>4 bays / 100m²</td> </tr> <tr> <td>Retail</td> <td>4 bays / 100m²</td> </tr> <tr> <td>Hotel</td> <td>0.7 bays / bedroom + 0.5 bays / employee</td> </tr> </tbody> </table>	Land Use	Parking Rate	Residential (Single Residential)	1 bay / dwelling	Residential (Sectional Title)	1 bay / dwelling + 0.5 bays / dwelling for visitors	Office	4 bays / 100m ²	Retail	4 bays / 100m ²	Hotel	0.7 bays / bedroom + 0.5 bays / employee
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Retail	4 bays / 100m ²												
Hotel	0.7 bays / bedroom + 0.5 bays / employee												
<p>21 Future Road Planning</p>	<p>The following road upgrades are planned in the development vicinity in the future:</p> <ul style="list-style-type: none"> • First phase dualling of the R301 (MR201) from the N1 through the Kliprug Minor Road (OP5255) as indicated on Figure 8. A second phase dualling is planned along MR201 further south of Kliprug Minor Road through the MR201 / Schuurmansfontein Road intersection. A road reserve of 42m would be required along the R301 (MR201) in the future on the eastern border of the Avec La Terre development site to accommodate the future dualling. • A Class 3 Road is planned from the Kliprug Minor Road (OP5255) passing the existing Val De Vie, through the future De Hoop and pass the future The Acres developments and is planned to intersect with Schuurmansfontein Road. • It is planned to extent Schuurmansfontein Road over the Berg River to link with Watergat Road (DR1091) to the R45 (MR191). A sensitivity analysis was done to determine the potential impact this link will have on the geometric layout of the development accesses. The analysis revealed that a dedicated right-turn lane would be required at the Access 1 / Schuurmansfontein Road (Study intersection 5) should the Schuurmansfontein Road – Watergat Link Road over the Berg River be constructed. The proclaimed road reserve width of Schuurmansfontein Road is 20m wide. A dedicated right-turn lane can be accommodated in this width of road reserve. The width from the existing centre line to the erf boundary is approximately 9.6m. However, this is to the edge of the buffer zone therefore this road reserve can be 												

	<p>established in the future should Schuurmansfontein be built through to the R45 (MR191).</p> <p>These upgrades may result in a slight redistribution of traffic and improvement at the Schuurmansfontein Road / MR201 intersection. However, the timeframes for these upgrades are not known and therefore the minimum upgrades recommended as part of the Avec La Terre development should be implemented in the interim to accommodate the proposed development.</p>
<p>22 Street Lighting</p>	<p>Existing Facilities: There are currently no streetlights along the R301 (MR201) or Schuurmansfontein Road in the development vicinity.</p> <p>Recommended Facilities: It is recommended that streetlighting be provided at the two-development accesses and at the intersection of the R301 (MR201) and Schuurmansfontein Road.</p>
<p>23 Refuse Removal</p>	<p>Based on discussions with the Drakenstein Municipality refuse collection will not occur within the development and therefore space for refuse collection should be provided at the development accesses.</p> <p>The site development plan indicates that a refuse embayment would be provided at Access 1 of the development. This has been analysed by means of a AutoTurn software analysis and were found to be acceptable. A refuse point will also be provided at Access two of the development. Here refuse trucks can use the roundabout at the amenities area to turn around and exit the development. Various heavy vehicles were tested at this roundabout with the AutoCAD AutoTURN analysis software, and it is expected that refuse trucks would be able to make U-turns at this roundabout.</p>
<p>24 Findings & Recommendations</p>	<p>This report summarises an investigation of the transport impacts, expected as part of the Avec La Terre development planned on Portion 11 of Farm 1426, Paarl.</p> <p>The development will include the following land uses:</p> <ul style="list-style-type: none"> • Single Residential 216 units • Commercial 2.7 ha <ul style="list-style-type: none"> ○ Office 200m² ○ Retail 200m² ○ Hotel 40 rooms ○ Residential 100 units Sectional title

Findings:

Pertinent findings of this TIA are as follows:

Scenario 1 – 2022 Existing Traffic Conditions: All study intersections currently operate acceptably during the typical weekday AM and PM peak hours.

Scenario 2 – 2027 Background Traffic Conditions – All study intersections are projected to continue to operate acceptably with the dualling upgrades planned along the R301 (MR201) between the N1 and Kliprug Minor Road.

Development Trips: The proposed development is estimated to generate a total of 300 weekday a.m. peak hour- and 333 weekday p.m. peak hour vehicle trips respectively upon full build-out of the development.

Site Access and Queuing: Refer to Section 14 of this report for a detailed summary of the proposed access location, access spacing requirements as well as the stacking requirement at Access 1. Site access points as well as internal intersections must be designed to meet sight distance requirements.

Scenario 3 – 2026 Total Traffic (Phase 1 & Phase 2): Based on WCG right-turn lane volume warrants it is recommended that a southbound right-turn lane in accordance with WCG design standards be provided at the R301 (MR201) / Schuurmansfontein Road (DR1095) intersection. This upgrade should be implemented by the developer of the Avec La Terre Development.

Scenario 4 – 2027 Total Traffic (Phase 1 to Phase 4): It is projected that the study intersections will continue to operate acceptably.

Scenario 5 – 2028 Total Traffic (Phase 1 to Phase 5): It is projected that the study intersections will continue to operate acceptably.

Recommendations:

Subject to Provincial and Municipal Approval, the following recommendations are proposed:

- Provide a southbound right-turn lane at the Schuurmansfontein Road / R301 (MR201) intersection. The southbound right-turn lane should have a minimum storage lane length to accommodate a 90th percentile queue of one vehicle.
- Provide streetlights at both development accesses and at the intersection of R301 (MR201) and Schuurmansfontein Road (DR1095).

	<ul style="list-style-type: none">• Parking should be provided at the rates provided in Section 20 <p>Based on this investigation, it is evident that the expected transport impacts from the Avec La Terre development could be sufficiently mitigated, provided that the upgrades as discussed in this report are in place. Hence, it is recommended that this development be considered for approval from a transport point of view.</p>
--	--

REFERENCES

1. Highway Capacity Manual (HCM), Quality and Level-of-Service Concepts, Transportation Research Board, 9 March 2015
2. South African Road Classification and Access Management Manual, TRH26, Version 1.0, August 2012
3. South African Trip Data Manual, TMH17, Version 1.1, COTO, September 2013
4. Access Management Guidelines, Second Edition, Western Cape Government, 2020

Annexure A

Figures

- Figure 1: Locality Plan
- Figure 2: Site Development Plan
- Figure 3: 2022 Existing Lane Configuration and Traffic Control
- Figure 4: 2022 Existing Traffic Conditions (Scenario 1)
- Figure 5: Approved, In-Process and Planned Developments in the Paarl South Area
- Figure 6: Expected Approved Development Trips
- Figure 7: 2027 Background Lane Configuration and Traffic Control
- Figure 8: WCG Upgrades along MR201 (R301)
- Figure 9: 2027 Background Traffic Conditions (Scenario 2)
- Figure 10: 2026 Expected Phase 1 & Phase 2 Development Trips and Distribution
- Figure 11: Planned Access Spacing
- Figure 12: 2026 Total (Phase 1 & Phase 2) Lane Configuration and Traffic Control
- Figure 13: 2026 Total Traffic Conditions (Scenario 3)
- Figure 14: 2027 Expected Phase 3 & Phase 4 Development Trips and Distribution
- Figure 15: 2027 Total Traffic Conditions (Scenario 4)
- Figure 16: 2028 Total (Phase 5) Lane Configuration and Traffic Control
- Figure 17: 2028 Expected Phase 5 Development Trips and Distribution
- Figure 18: 2028 Total Traffic Conditions (Scenario 5)



SCHEMATIC



PROJECT:
AVEC LA TERRE
 PORTION 11 OF FARM 1426, PAARL

FIGURE:
LOCALITY PLAN
WIDER AREA

NUMBER:
1A



SCHMATIC



<p>PROJECT:</p> <p style="text-align: center;">AVEC LA TERRE PORTION 11 OF FARM 1426, PAARL</p>	<p>FIGURE:</p> <p style="text-align: center;">LOCALITY PLAN ZOOMED VIEW</p>	<p>NUMBER:</p> <p style="text-align: center;">1B</p>
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General Notes

- All work, including mechanical and electrical work, is to be done in accordance with the National Building Regulations.
- All materials and workmanship are to comply with the relevant SANS codes.
- This drawing is to be deemed to include all that is required for and consistent with good building practice regardless of any specific omissions.
- This drawing is not to be scaled. Figured dimensions are to be used. All dimensions are in millimetres unless otherwise stated.
- This drawing must be read in conjunction with all relevant drawings and specifications.
- All dimensions and levels must be checked on site by the Contractor before putting any work in hand.
- Any discrepancies on the drawings are to be brought to the Architects attention by the Contractor before putting any work in hand.
- The contractor must obtain the architect's written confirmation of any instructions which involve a variation to the contract before putting work in hand.
- All voids, suspended ceilings and partitions to be rodent-proofed in accordance with the Government rodent-proofing regulations.
- The architects retain copyright of this drawing.
- Contractors and sub-contractors are to ensure the structural stability of all components of their work, and to ascertain that the main structure is capable of supporting all loads applied thereto.

Description Of Previous Numbers:

1,2,3	Pre-construction Issue
A,B,C	Construction Issue

REVISIONS

Rev	Date	Description
2	2022-09-30	Site Plan
1	2022-09-22	Site Plan
3	2022-10-13	Site Plan
4	2022-10-27	Mixed Use Site updated

Client
Plusus
Client Signature

Architect
Bruce Wilson | PArch 20720
082 533 8575
bruce@wilson.co.za

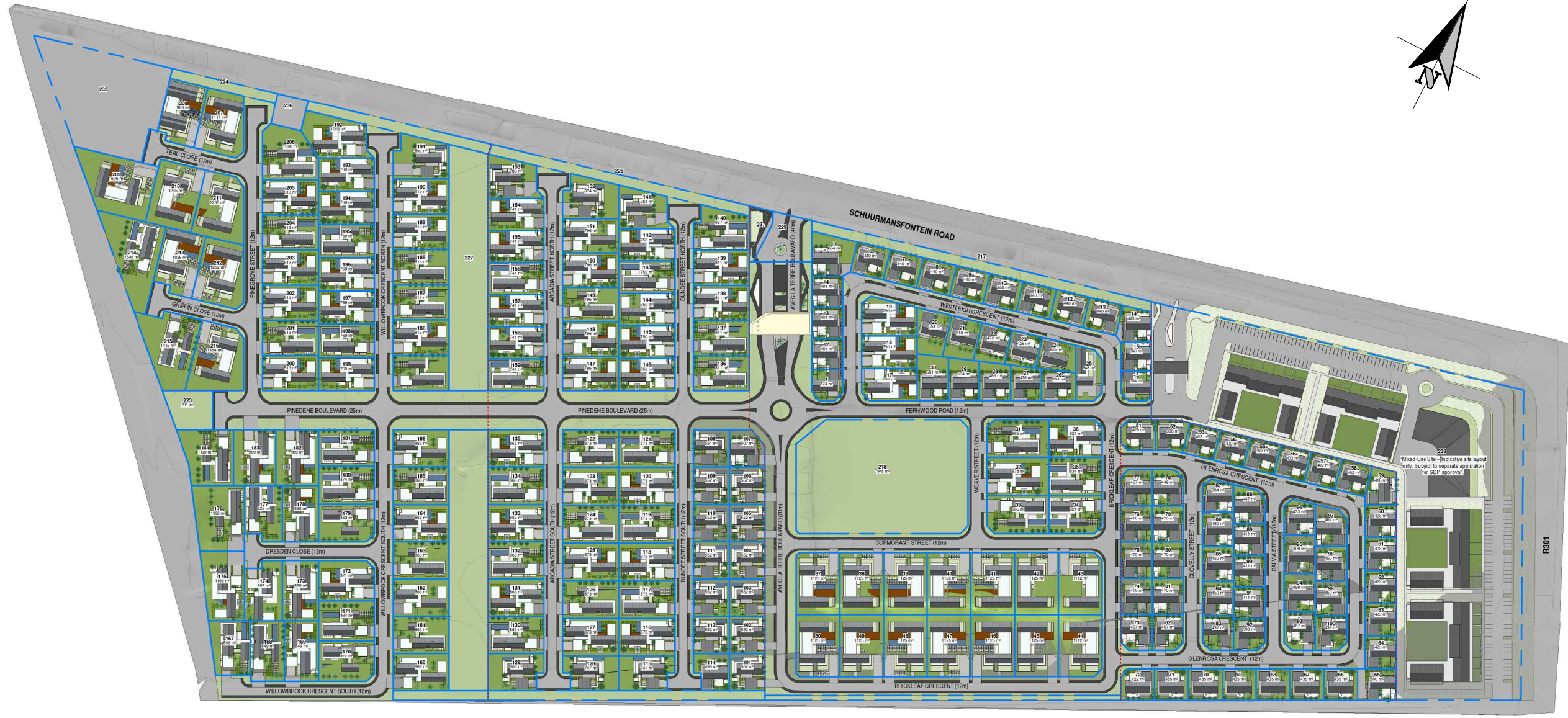
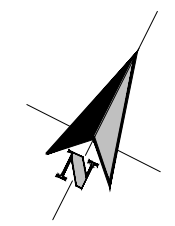
Architect Signature *Bruce Wilson*
Rev | Date | Description
4 | 2022-10-27 | Mixed Use Site updated

Client Name
Plusus
Project
Avec La Terre

Erf Number & Location
Avec la Terre, Paarl
Project Address
Avec La Terre

Drawing Sheet Name
Site Development Plan
Project Status
INFORMATION

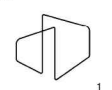
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-00 Site Development Plan
1:1500



Figure 2A
Site Development Plan





AVEC LA TERRE PAARL

REVISION HISTORY:

- Rev 1: Proposed subdivision, rezoning & phasing plan of Portion 11 of Farm No. 1426, Paarl.
- Rev 2: Minor internal subdivision amendments.
- Rev 3: Street names added.
- Rev 4: Minor internal subdivision amendments.

NOTES:

- All distances and areas are provisional and must be verified by cadastral survey.
- Figure ABCDE represents Portion 11 of Farm No. 1426, Paarl.

- - - - - Phasing Line
- # - Phasing Number
- # - Portion Number

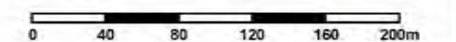
Phasing:

- 1 - 50 Units
- 2 - 50 Units
- 3 - 59 Units
- 4 - 57 Units

TITLE:

PROPOSED SUBDIVISION, REZONING & PHASING PLAN

SCALE: 1:4000 (A3)



PROPERTY DESCRIPTION:

PORTION 11 OF FARM 1426, PAARL

PROJECT DETAILS:

Project Name: Avec La Terre
 Project No: 22013
 Client: Future Megawatt (Pty) Limited
 Municipality: Drakenstein Municipality

PLAN DETAILS:

Plan No: 22013-003
 Revision: 4
 Date: 2022-10-17
 Drawn by: AR

Figure 2B
Site Development Plan



Office: +27 (0)21 180 3171 | Cell: +27 (0)82 448 0378
 Email: info@arouxplanning.co.za
 15500 21 - La Concorde Building, 57 Main Road, Paarl, 7601
 www.arouxplanning.co.za

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1/888

RE/1/1426

RE/1265

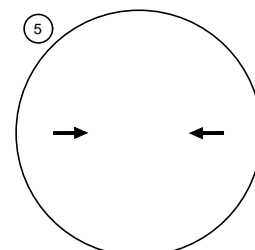
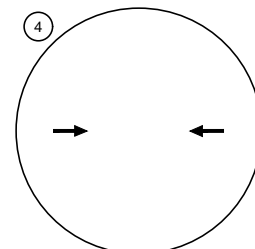
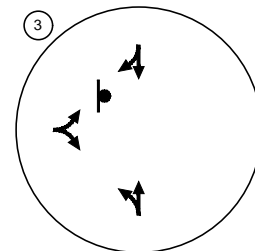
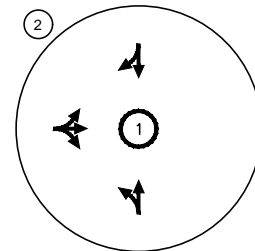
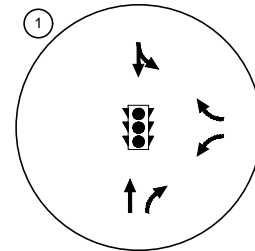
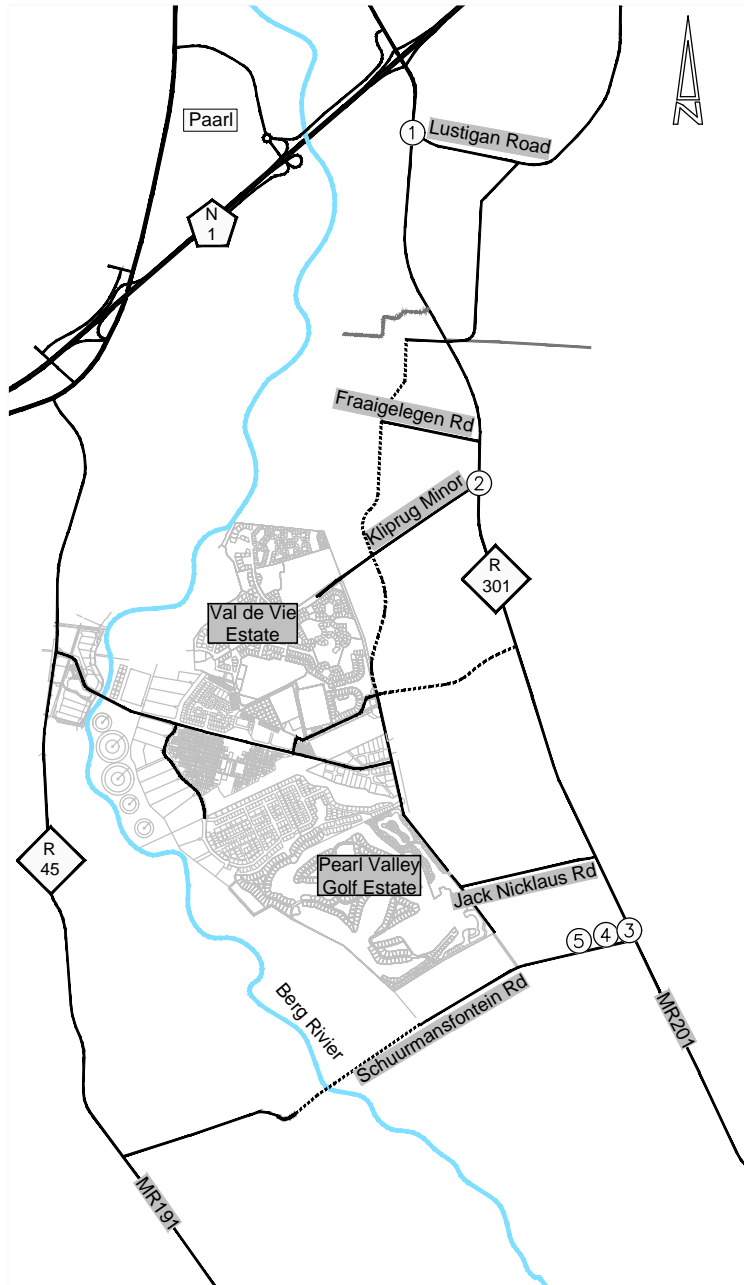
2/942

10/1426




9/1426

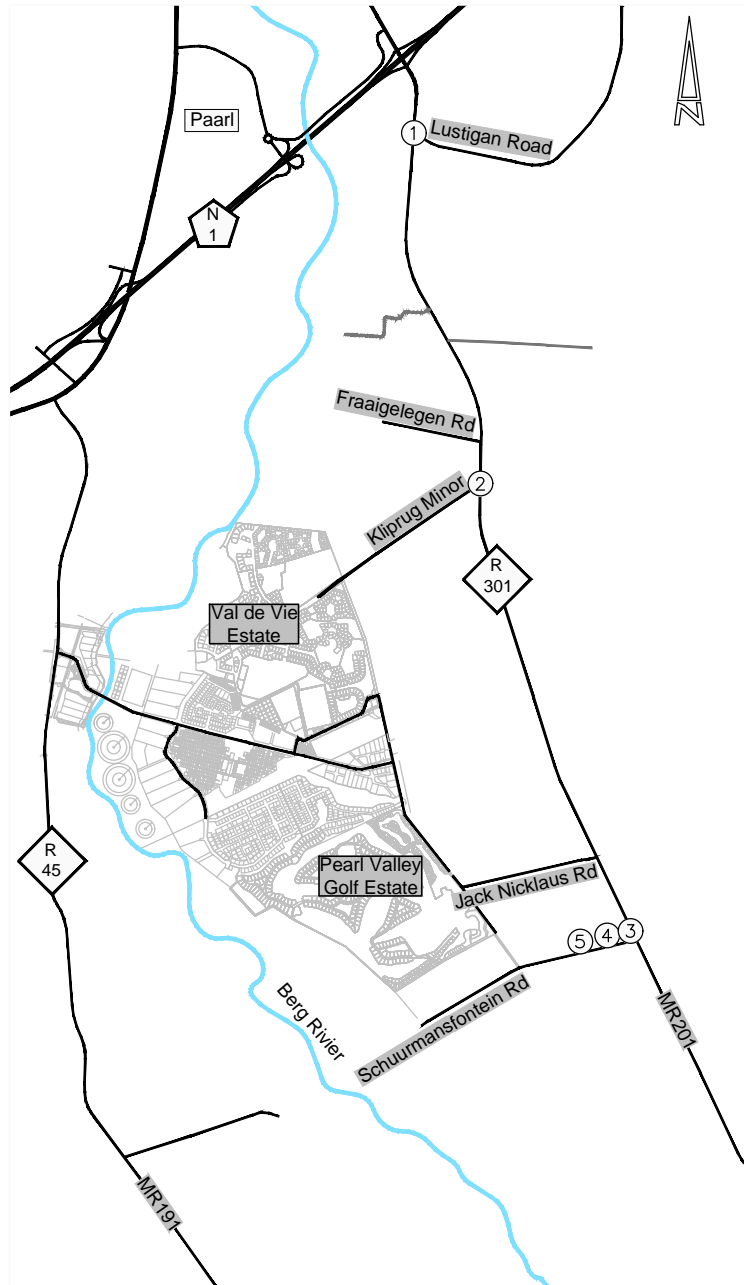
ZONING TABLE

ZONING	LAND USE	PTN NO	ERVEN	UNITS	AREA (ha)	%
Conventional Housing Zone	Single Residential	1 - 216	216	216	15,5826	56,70
Mixed-Use Zone	Mixed-Use	228	1	-	2,8274	10,29
Open Space Zone	Private Open Space	217 - 227	11	0	2,2666	8,25
Transport Zone	Private Road	229 - 232	4	0	5,7539	20,93
Utility Zone	Utility Services, Utility Plant	233 - 235	3	0	0,5139	1,87
Transport Zone	Public Road	236	1	0	0,5373	1,96
TOTAL			236	216	27,4817	100,00



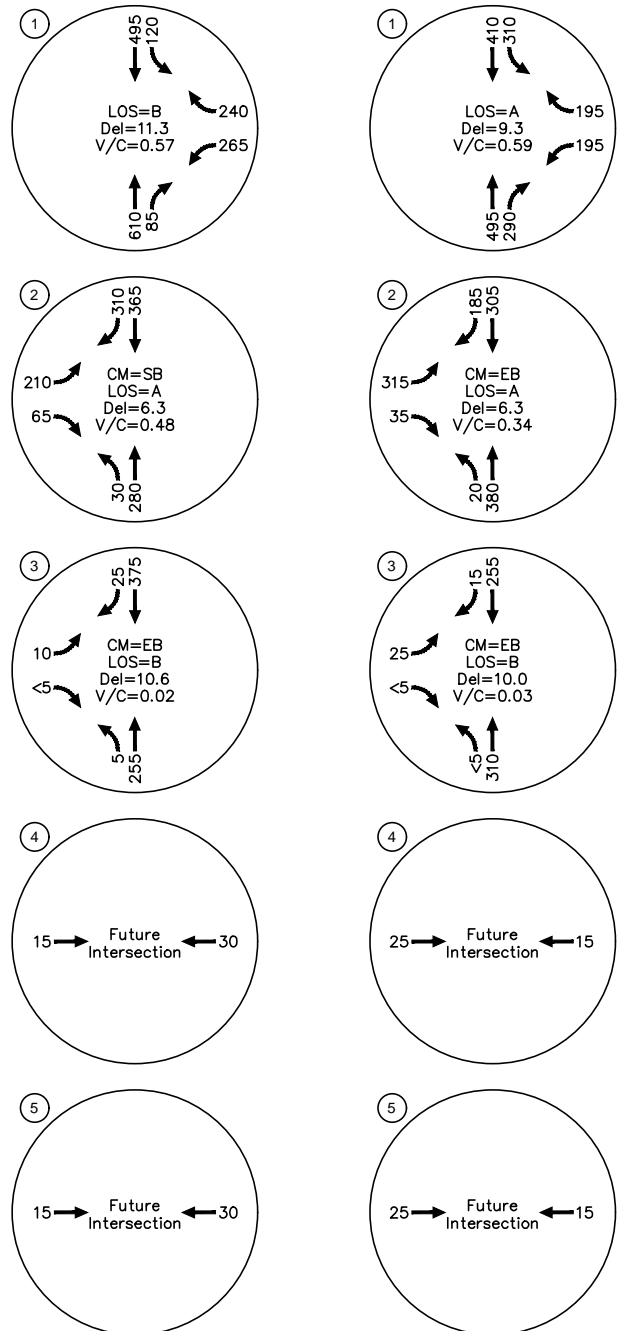
LEGEND

-  STOP/ YIELD CONTROL
-  TRAFFIC SIGNAL
-  ROUNDABOUT



a.m. peak hour

p.m. peak hour

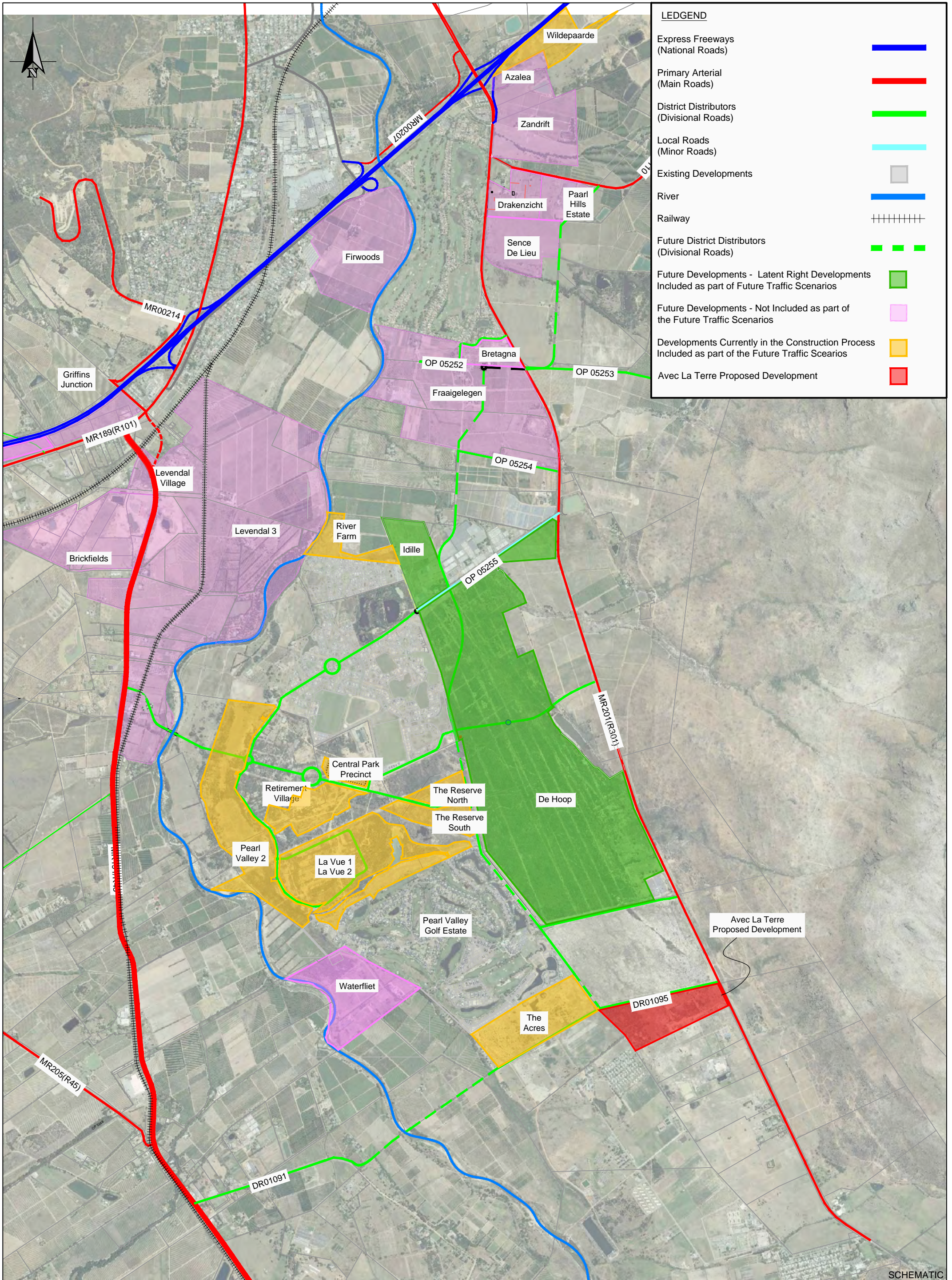


LEGEND

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 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALISED) /
 CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALED)
 Del = INTERSECTION AVERAGE DELAY (SIGNALISED) /
 CRITICAL MOVEMENT DELAY UNSIGNALISED
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

TRAFFIC COUNT DATE: 2022-07-22





LEDGEND

Express Freeways (National Roads)	
Primary Arterial (Main Roads)	
District Distributors (Divisional Roads)	
Local Roads (Minor Roads)	
Existing Developments	
River	
Railway	
Future District Distributors (Divisional Roads)	
Future Developments - Latent Right Developments Included as part of Future Traffic Scenarios	
Future Developments - Not Included as part of the Future Traffic Scenarios	
Developments Currently in the Construction Process Included as part of the Future Traffic Scenarios	
Avec La Terre Proposed Development	

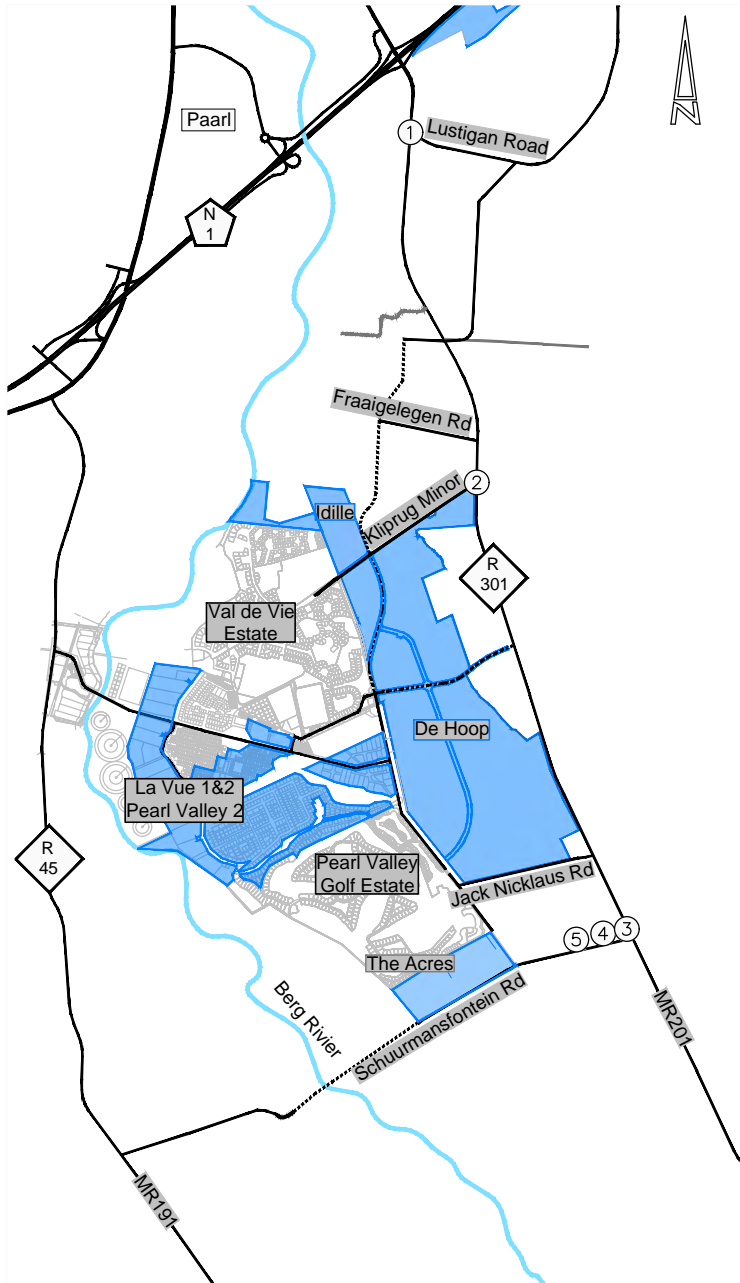
SCHMATIC



PROJECT: AVEC LA TERRE
PORTION 11 OF FARM 1426, PAARL

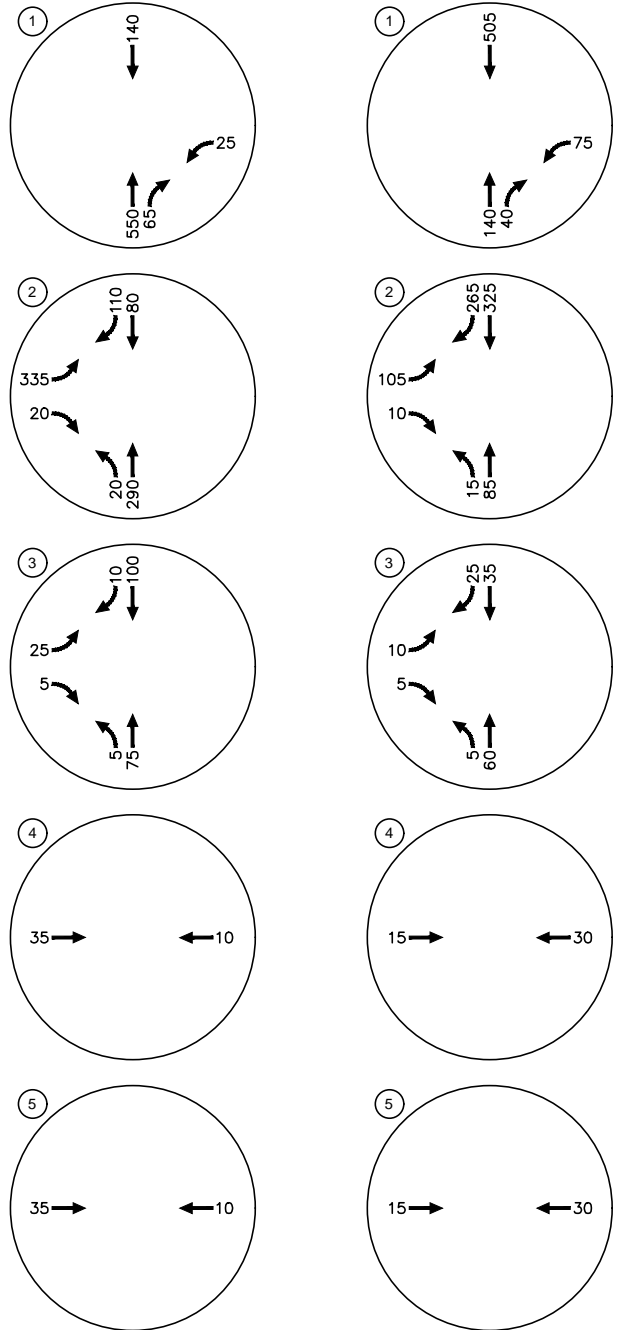
FIGURE: APPROVED, IN-PROCESS AND PLANNED DEVELOPMENTS IN THE
PAARL SOUTH AREA

NUMBER: 5

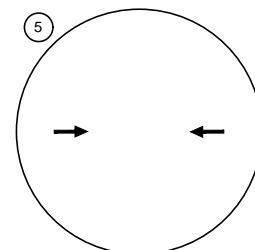
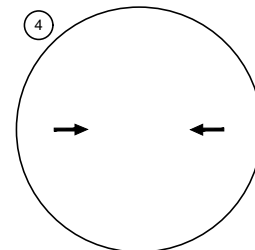
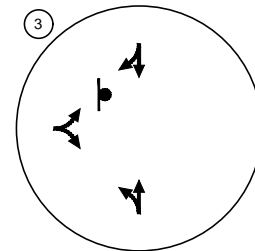
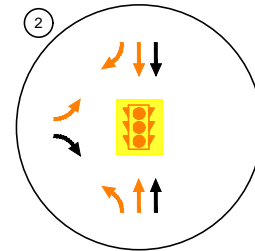
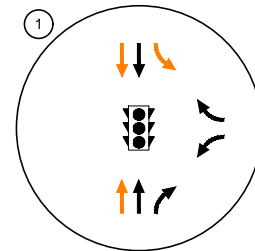
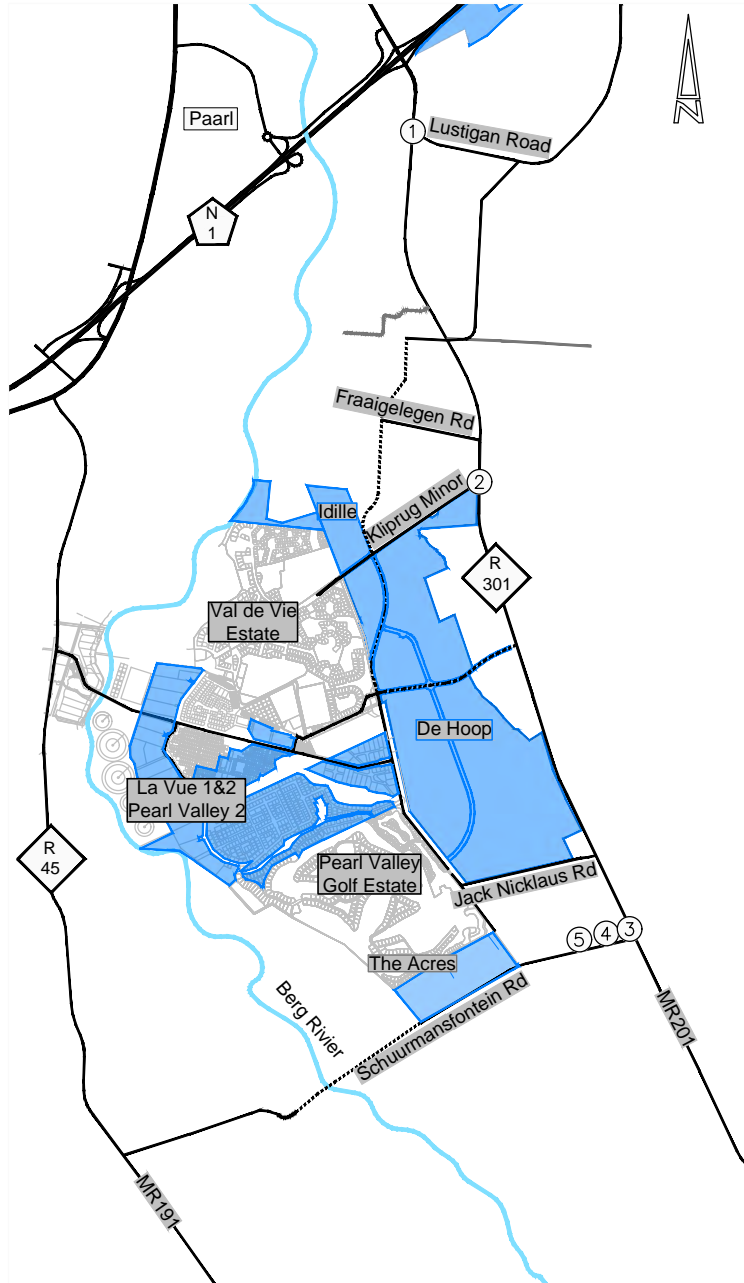


a.m. peak hour

p.m. peak hour



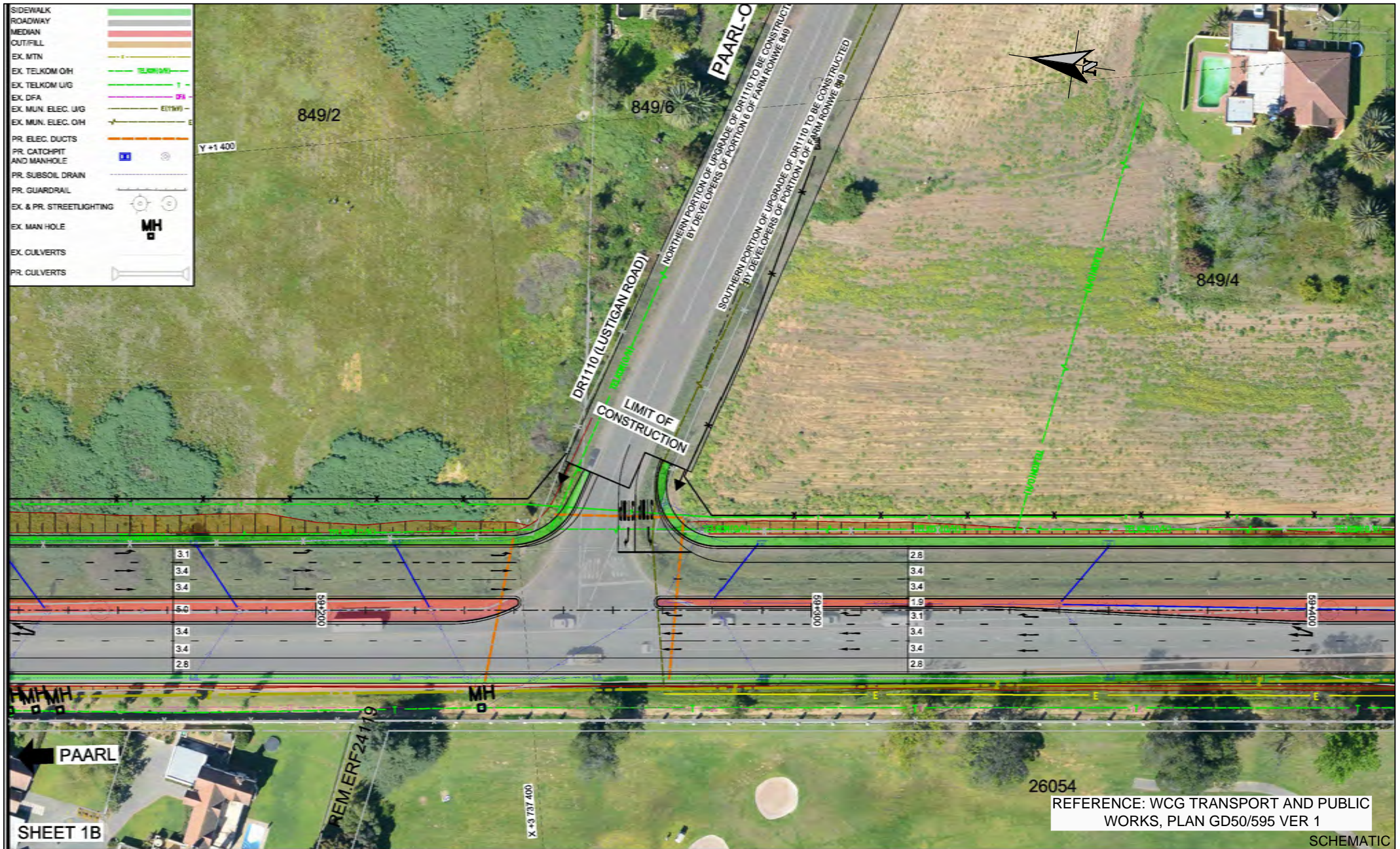
NOTE: THE TRIPS INDICATED ON THIS FIGURE WERE USED IN ALL THE BACKGROUND AND TOTAL TRAFFIC SCENARIOS.



For analysis purposes it was assumed that a traffic signal would already be warranted at this stage as expected from the traffic volumes projected through this intersection during this scenario

LEGEND	
	STOP/ YIELD CONTROL
	TRAFFIC SIGNAL
	ROUNDBABOUT
	UPGRADES PLANNED ALONG R301 (MR201) BY WCG
	APPROVED AND IN-PROCESS BACKGROUND DEVELOPMENTS

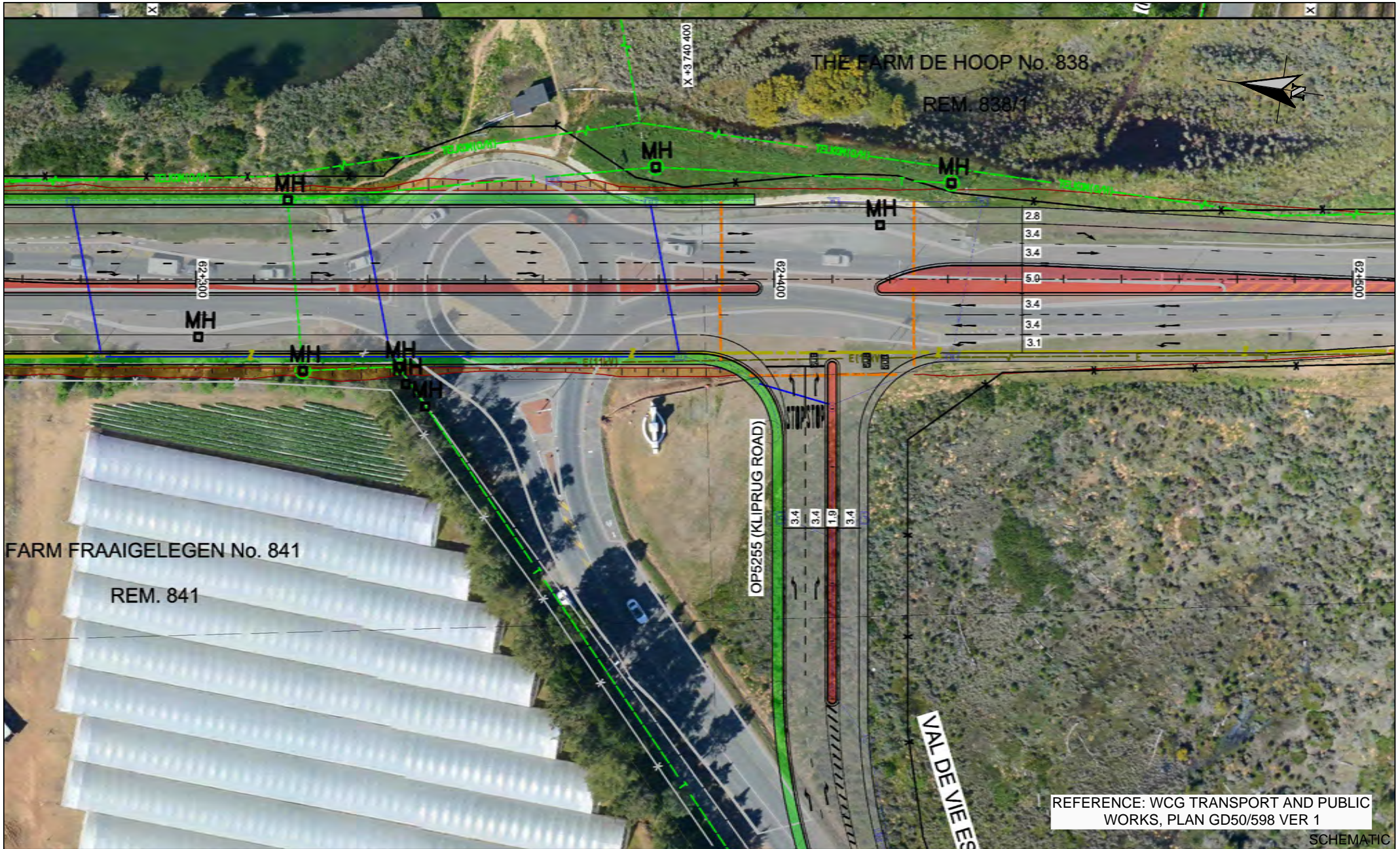




PROJECT: AVEC LA TERRE
PORTION 11 OF FARM 1426, PAARL

FIGURE: WCG UPGRADES AT LUSTIGAN ROAD / MR201 (R301)
INTERSECTION

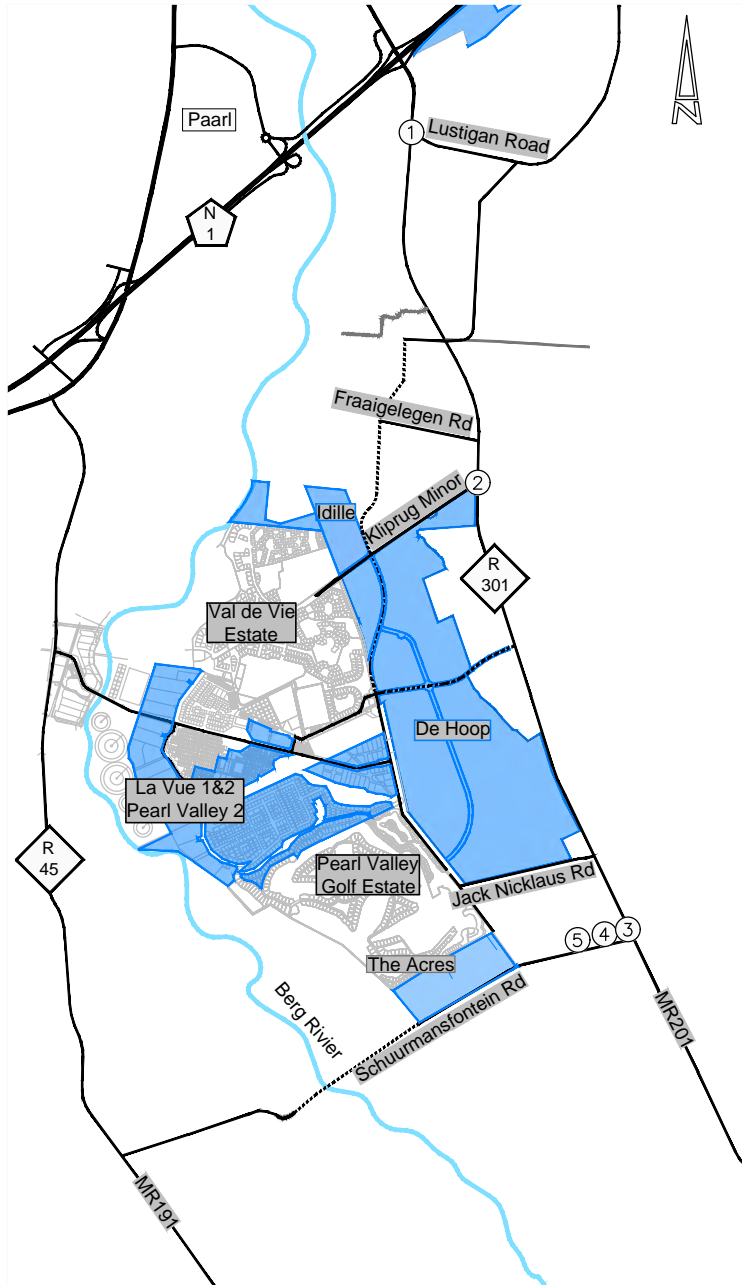
NUMBER: 8A



PROJECT: AVEC LA TERRE
PORTION 11 OF FARM 1426, PAARL

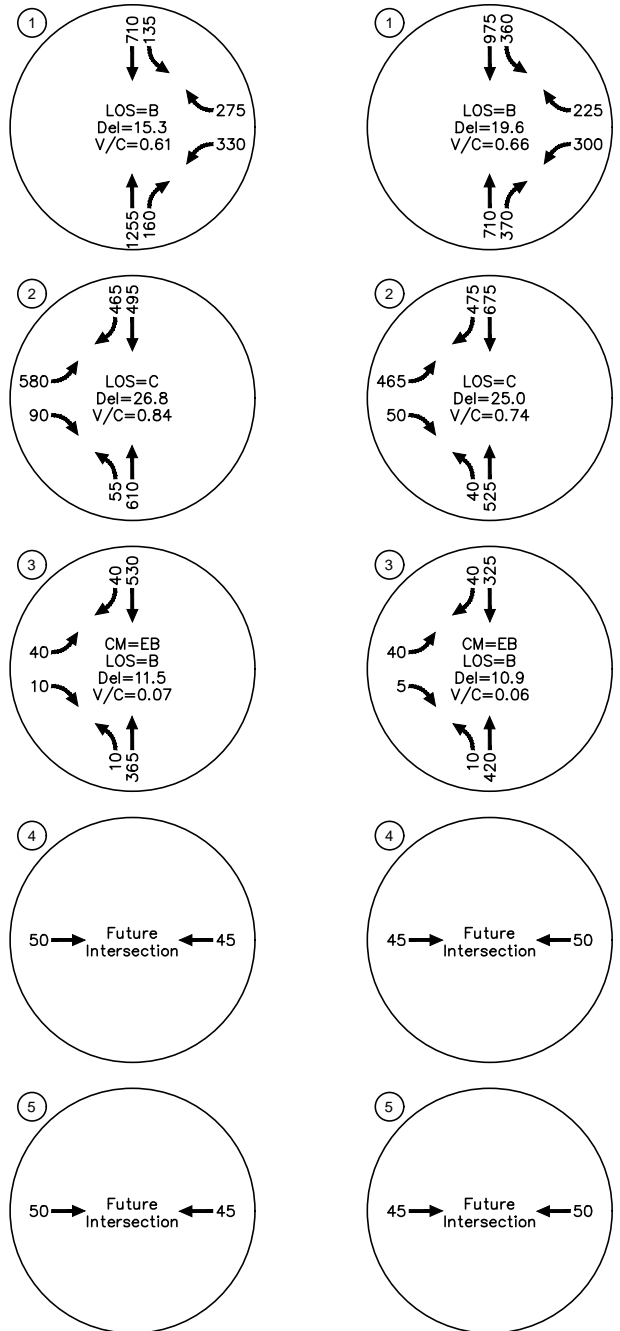
FIGURE: WCG PLANNED UPGRADES AT KLIPRUG MINOR ROAD
(OP5255) / MR201 (R301) INTERSECTION

NUMBER: 8B



a.m. peak hour

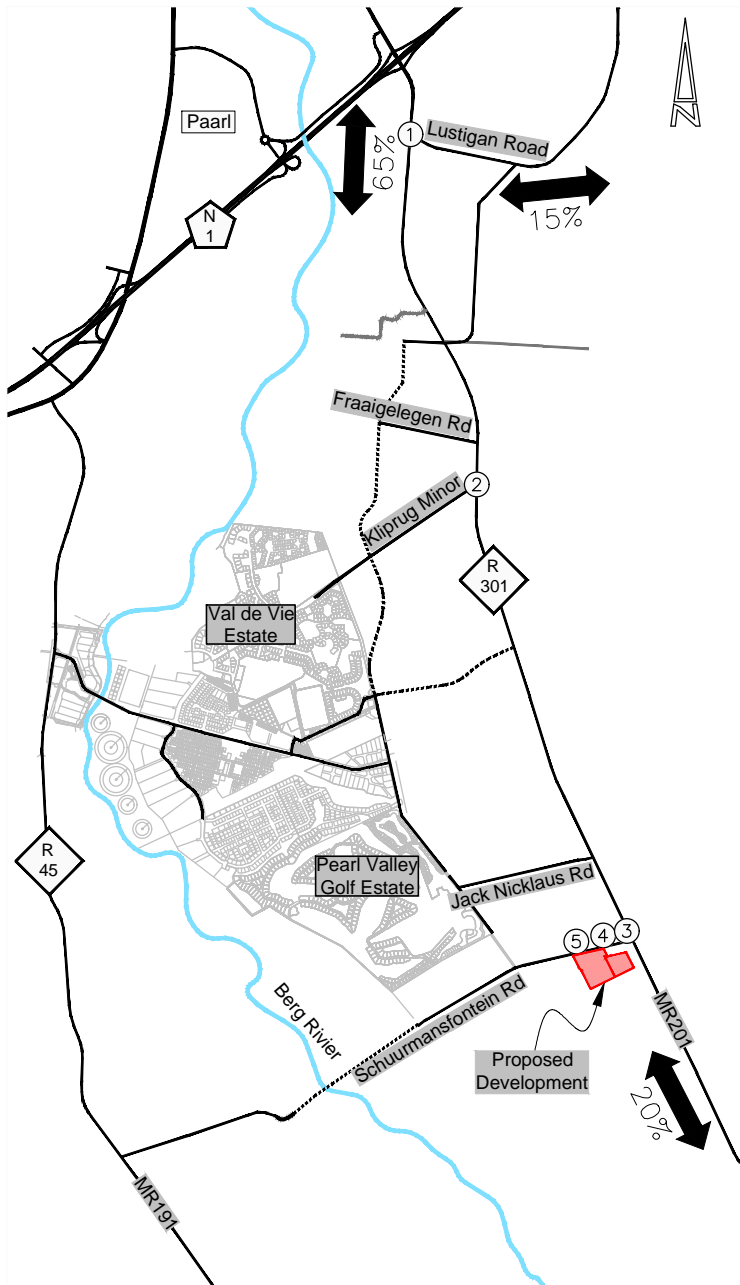
p.m. peak hour



LEGEND

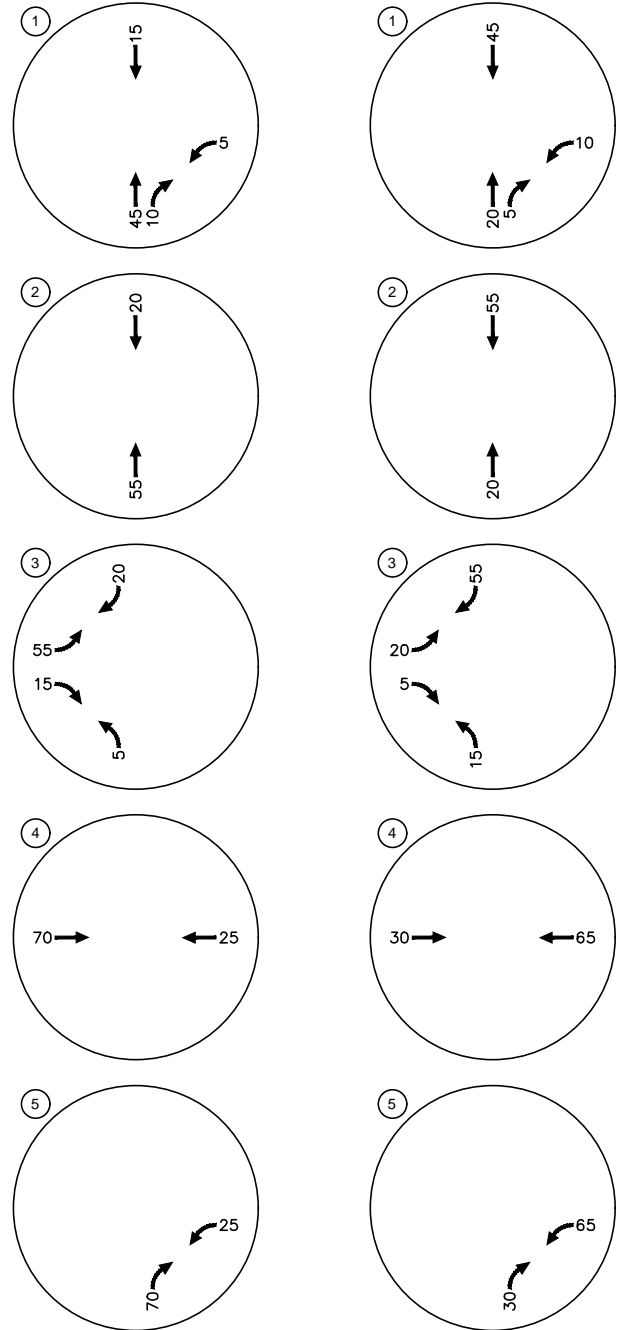
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 Del = INTERSECTION AVERAGE DELAY (SIGNALISED) /
 CRITICAL MOVEMENT DELAY UNSIGNALISED
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 APPROVED AND IN-PROCESS
 BACKGROUND DEVELOPMENTS





a.m. peak hour

p.m. peak hour



LEGEND	
	AVEC LA TERRE DEVELOPMENT PHASE 1 & PHASE 2

PEAK HOUR	IN	OUT	TOTAL
AM PEAK	23	71	94
PM PEAK	66	28	94

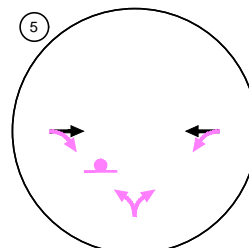
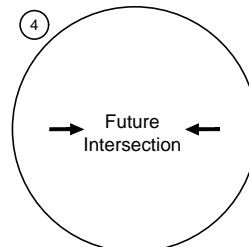
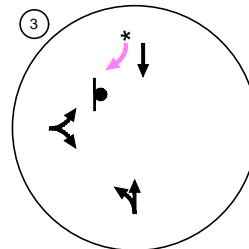
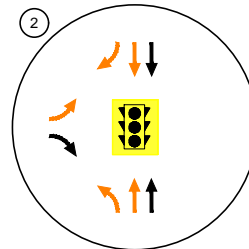
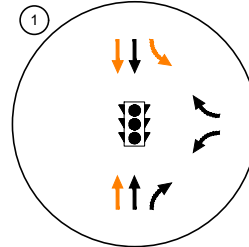
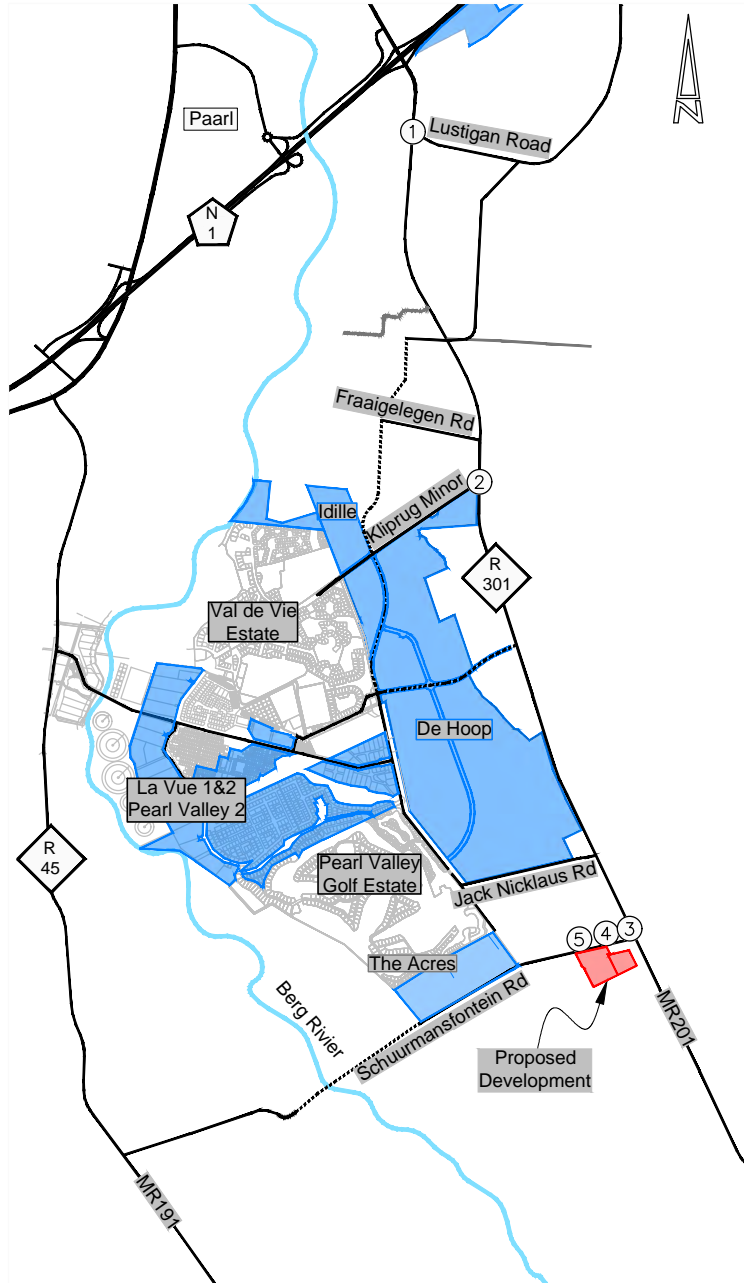


REQUIRED ACCESS SPACING			
ROAD SIDE ENVIRONMENT	ROAD CLASS	DESCRIPTION	UNSIGNALISED FULL INTERSECTION TO UNSIGNALISED FULL INTERSECTION
SEMI-RURAL	CLASS 4	ALONG A CLASS 4 ON THE APPROACH TO A CLASS 2 ROAD	225m
SEMI-RURAL	CLASS 4	BETWEEN INTERSECTIONS ALONG A CLASS 4 ROAD	145m



SCHEMATIC












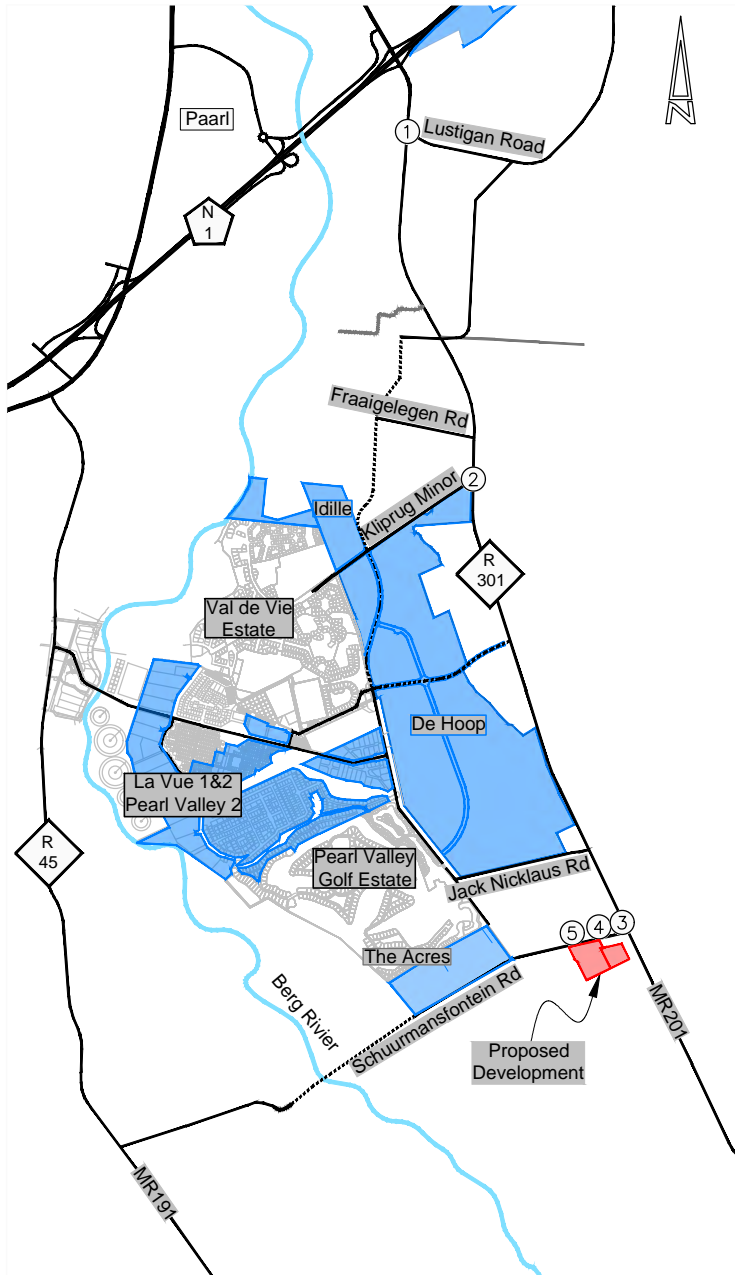
For analysis purposes it was assumed that a traffic signal would already be warranted at this stage as expected from the traffic volumes projected through this intersection during this scenario

* A right-turn lane with a minimum storage lane length to accommodate at least one vehicle based on the 90th percentile queue should be provided.

LEGEND

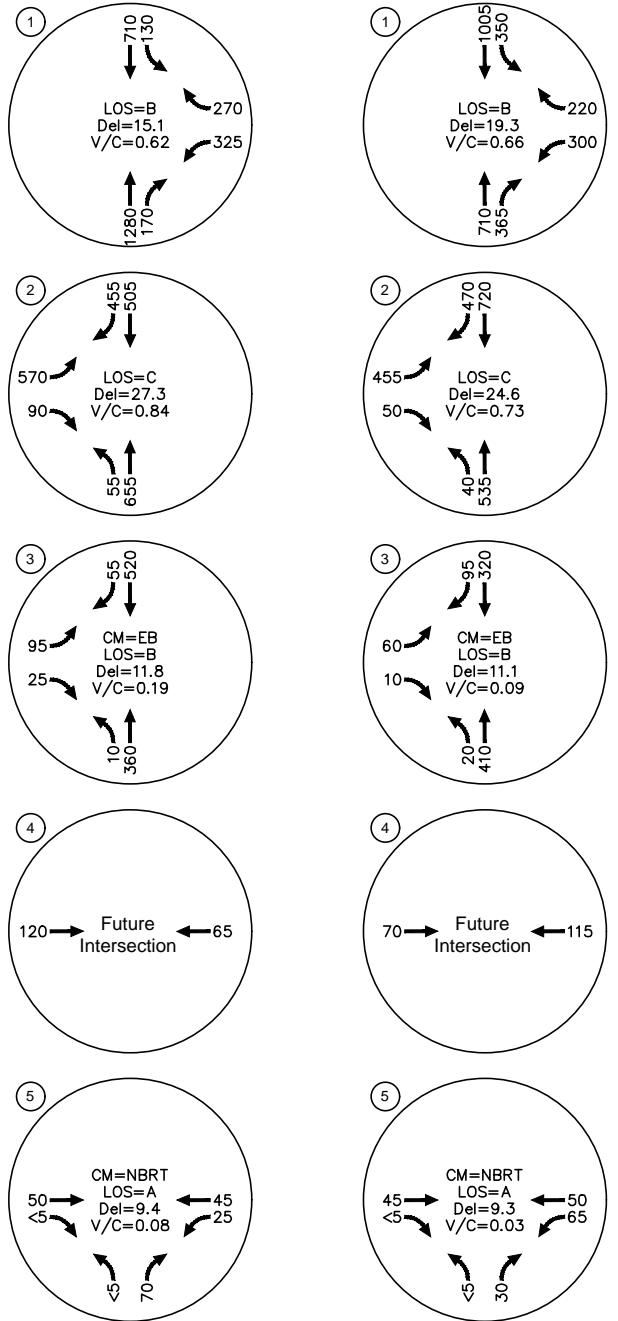
-  STOP/ YIELD CONTROL
-  TRAFFIC SIGNAL
-  ROUNDABOUT
-  BACKGROUND UPGRADES PLANNED ALONG R301 (MR201) BY WCG
-  2026 TOTAL TRAFFIC PHASE 1 & PHASE 2 UPGRADES
-  APPROVED AND IN-PROCESS BACKGROUND DEVELOPMENTS
-  AVEC LA TERRE DEVELOPMENT PHASE 1 & PHASE 2





a.m. peak hour

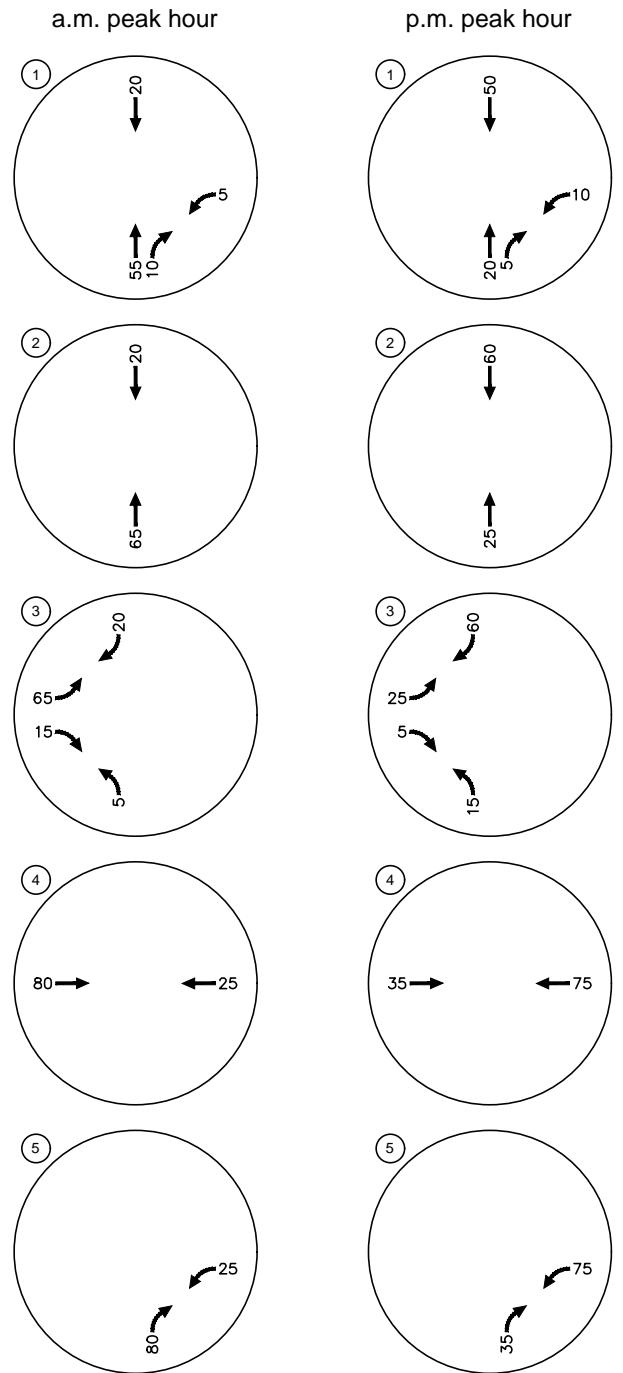
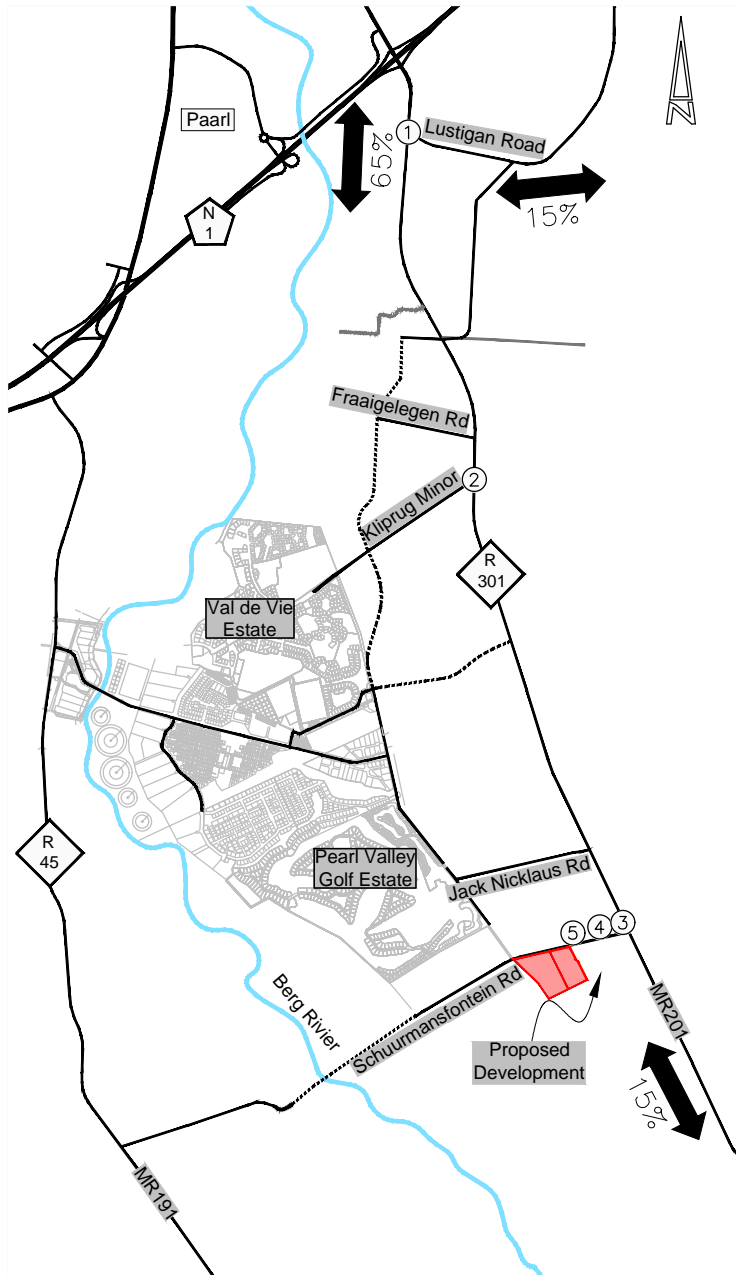
p.m. peak hour



LEGEND

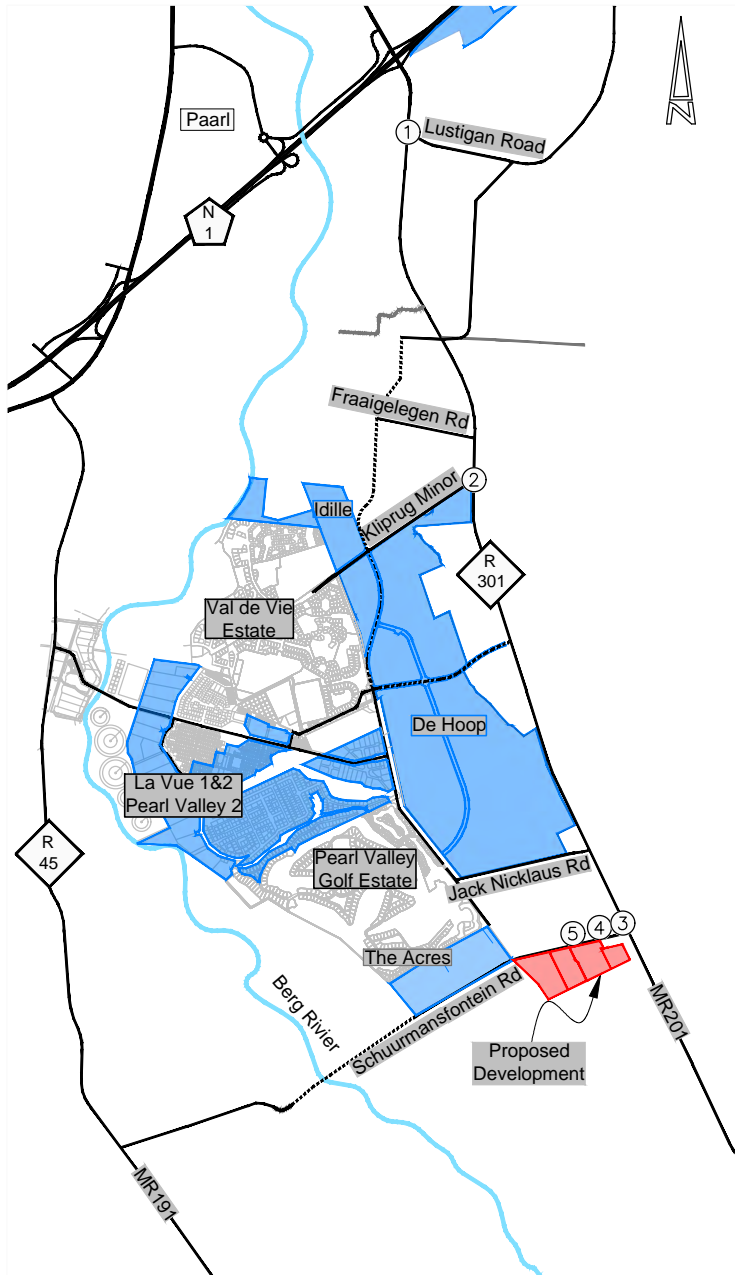
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- Del = INTERSECTION AVERAGE DELAY (SIGNALED) / CRITICAL MOVEMENT DELAY (UNSIGNALED)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- APPROVED AND IN-PROCESS BACKGROUND DEVELOPMENTS
- AVEC LA TERRE DEVELOPMENT PHASE 1 & PHASE 2





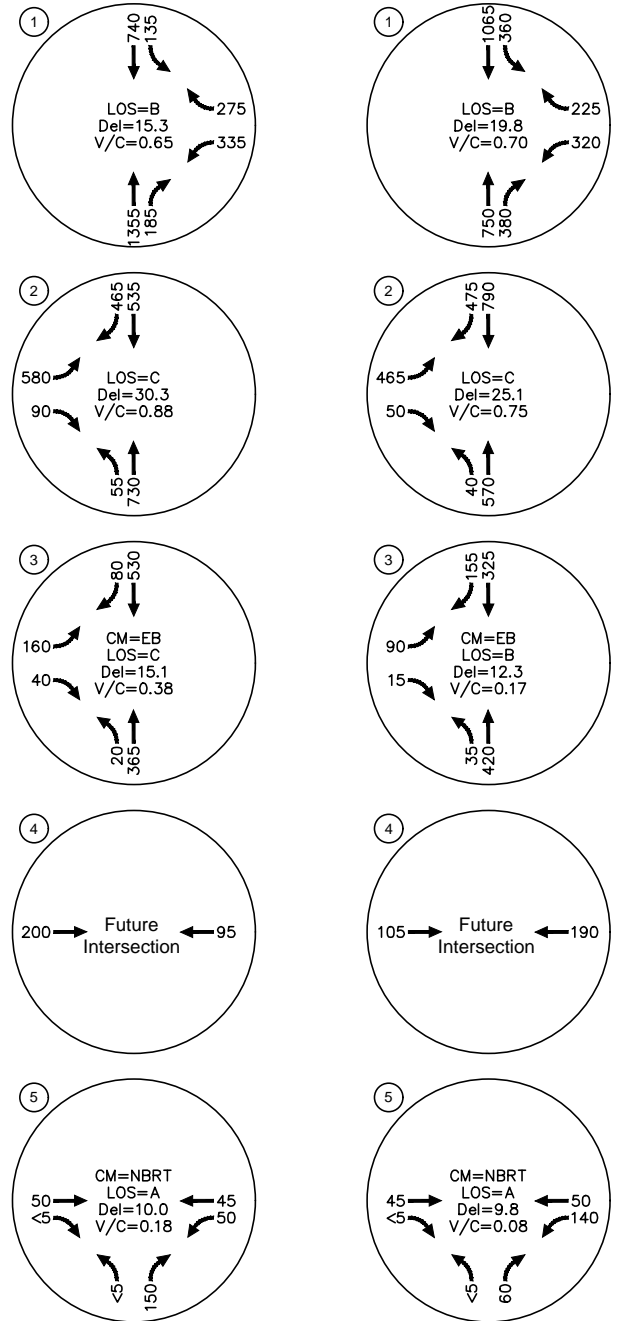
LEGEND	
	AVEC LA TERRE DEVELOPMENT PHASE 3 & PHASE 4

NEW PHASE 3 & 4 TRIPS			
PEAK HOUR	IN	OUT	TOTAL
AM PEAK	27	82	109
PM PEAK	76	33	109
TOTAL SCENARIO 4 DEVELOPMENT TRIPS			
PEAK HOUR	IN	OUT	TOTAL
AM PEAK	50	153	203
PM PEAK	142	61	203



a.m. peak hour

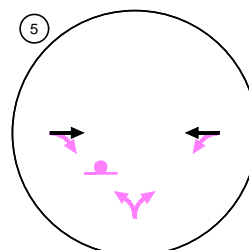
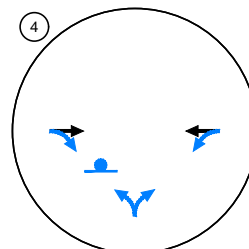
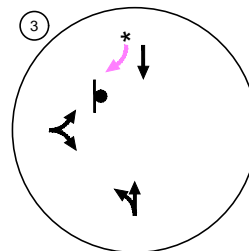
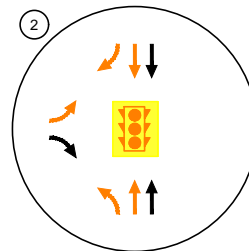
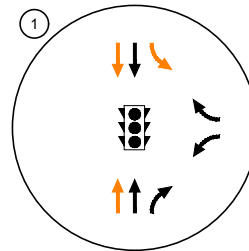
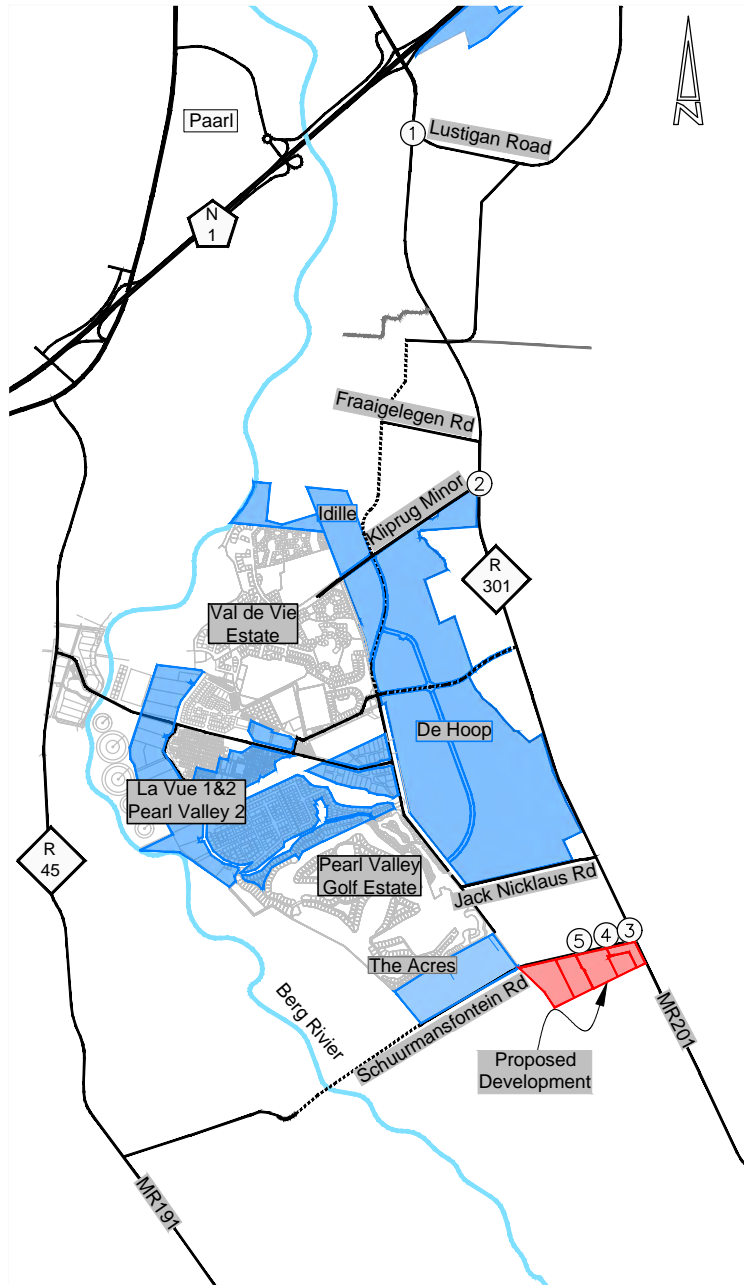
p.m. peak hour



LEGEND

- CM = CRITICAL MOVEMENT (UNSIGNALLISED)
- LOS = INTERSECTION LEVEL OF SERVICE (SIGNALISED) / CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALLISED)
- Del = INTERSECTION AVERAGE DELAY (SIGNALISED) / CRITICAL MOVEMENT DELAY (UNSIGNALLISED)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- APPROVED AND IN-PROCESS BACKGROUND DEVELOPMENTS
- AVEC LA TERRE DEVELOPMENT PHASE 1, PHASE 2, PHASE 3 & PHASE 4





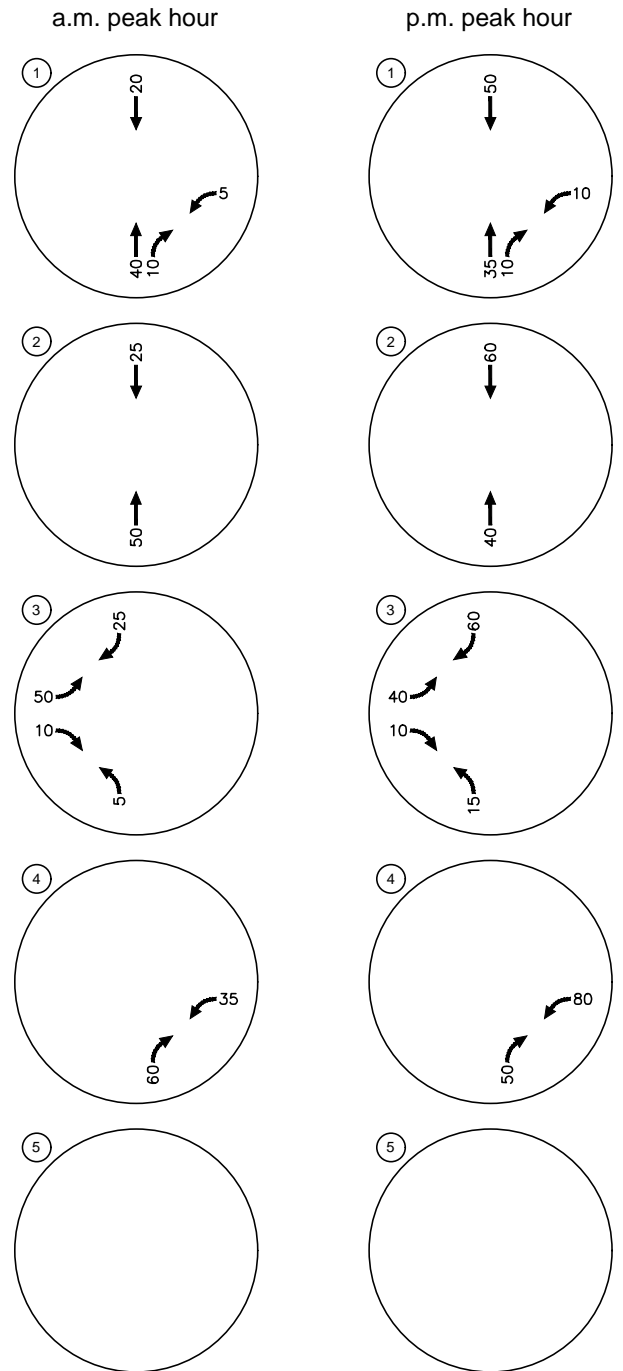
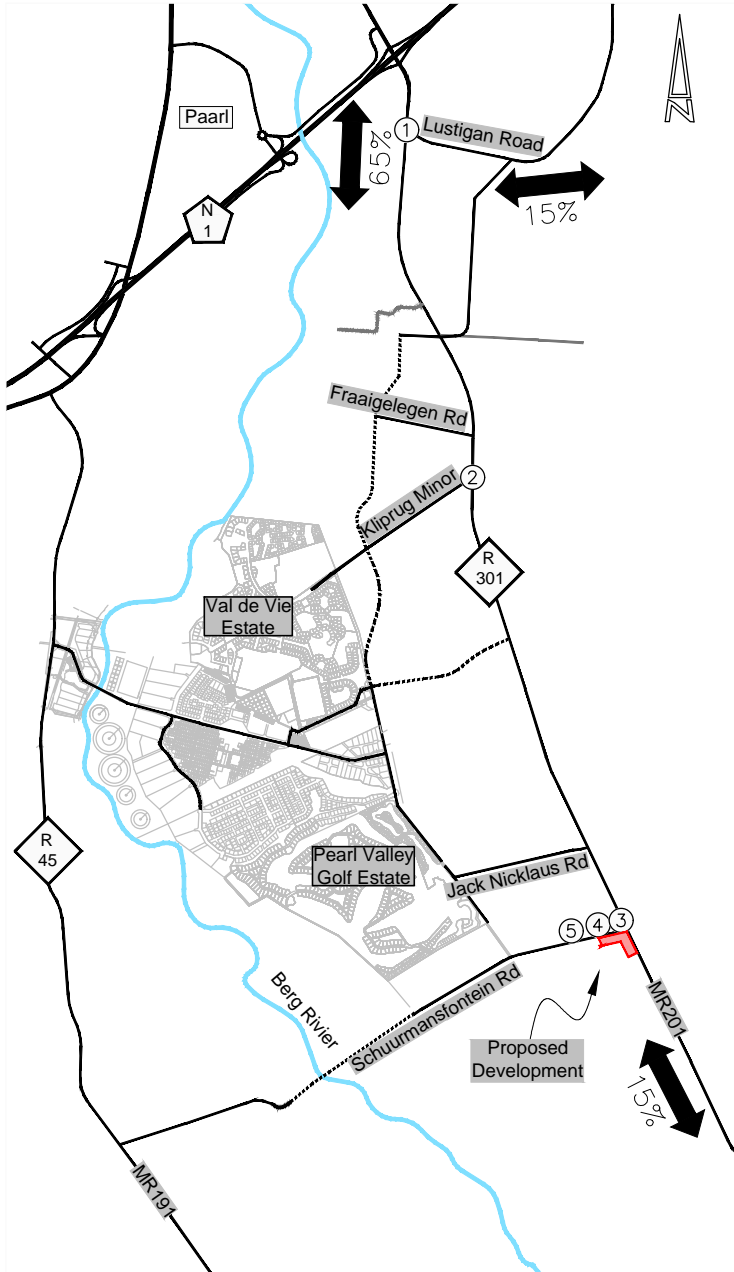
For analysis purposes it was assumed that a traffic signal would already be warranted at this stage as expected from the traffic volumes projected through this intersection during this scenario

* A right-turn lane with a minimum storage lane length to accommodate at least one vehicle based on the 90th percentile queue should be provided.

LEGEND

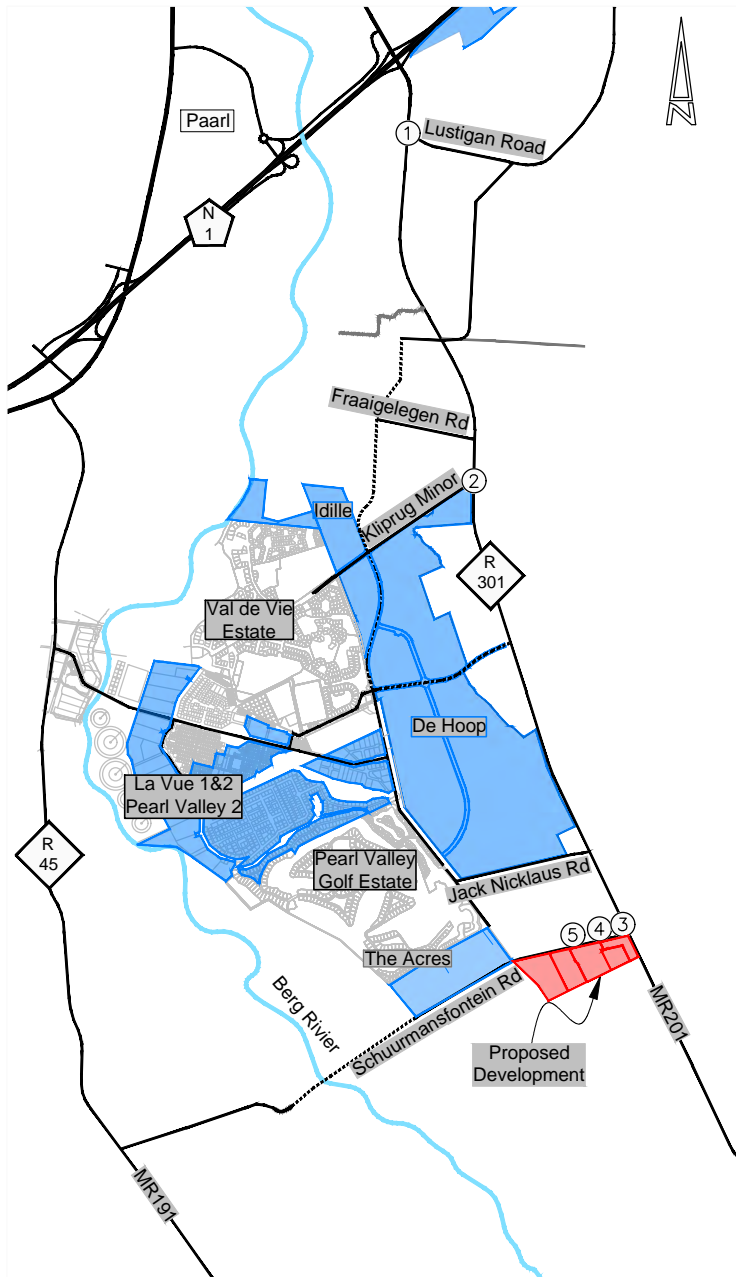
- STOP/YIELD CONTROL
- TRAFFIC SIGNAL
- ROUNDABOUT
- UPGRADES PLANNED ALONG R301 (MR201) BY WCG
- 2026 TOTAL TRAFFIC PHASE 1 & PHASE 2 UPGRADES
- 2028 TOTAL TRAFFIC PHASE 5 UPGRADES
- APPROVED AND IN-PROCESS BACKGROUND DEVELOPMENTS
- AVEC LA TERRE DEVELOPMENT PHASE 1, PHASE 2, PHASE 3 & PHASE 4





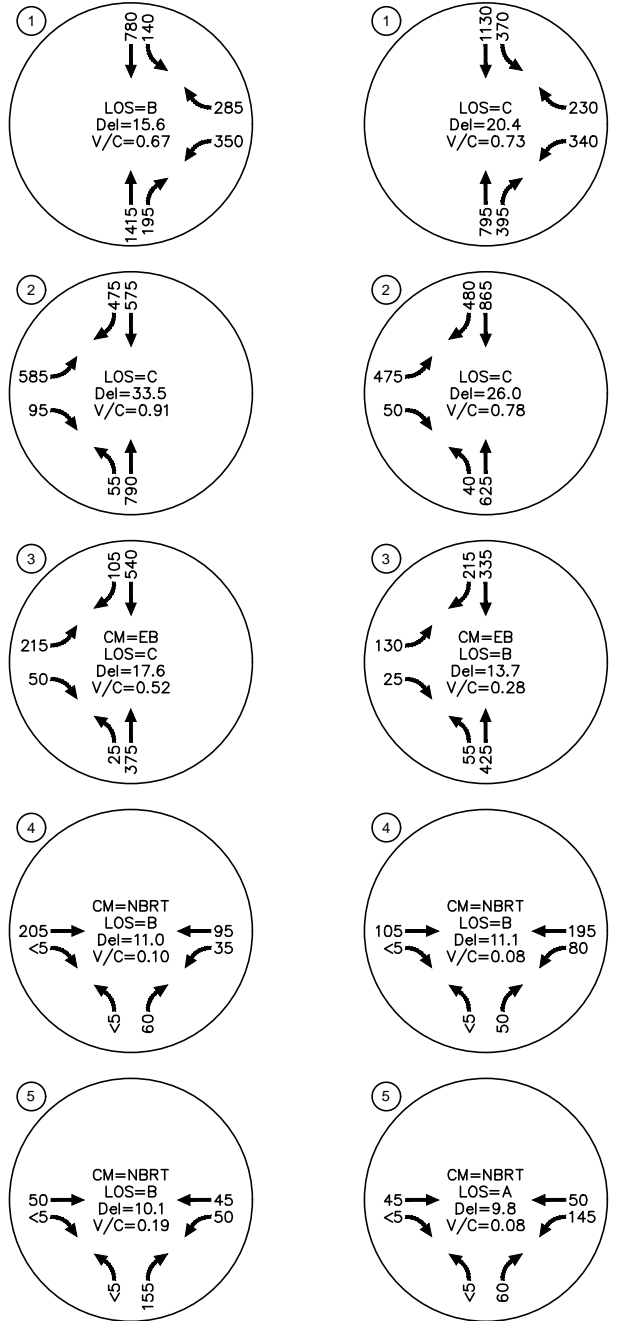
LEGEND	
	AVEC LA TERRE DEVELOPMENT PHASE 5

NEW PHASE 5 TRIPS			
PEAK HOUR	IN	OUT	TOTAL
AM PEAK	34	61	95
PM PEAK	79	51	130
TOTAL SCENARIO 5 DEVELOPMENT TRIPS (FULL DEVELOPMENT)			
PEAK HOUR	IN	OUT	TOTAL
AM PEAK	84	214	298
PM PEAK	221	112	333



a.m. peak hour

p.m. peak hour



LEGEND

- CM = CRITICAL MOVEMENT (UNSIGNALED)
- LOS = INTERSECTION LEVEL OF SERVICE (SIGNALISED) / CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALED)
- Del = INTERSECTION AVERAGE DELAY (SIGNALISED) / CRITICAL MOVEMENT DELAY (UNSIGNALED)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- APPROVED AND IN-PROCESS BACKGROUND DEVELOPMENTS
- AVEC LA TERRE DEVELOPMENT FULL DEVELOPMENT



Annexure B

Tables

Table 1: Trip Generation for the Proposed Development

Land Use	Unit	Source	Size/ Volume	Weekday AM Peak Hour				Weekday PM Peak Hour				Adjustment Factor		
				Rate	Adjusted Rate	In	Out	Rate	Adjusted Rate	In	Out	Mixed Use	Public Transport	Adjustment Factor
Residential - Phase 1 & Phase 2	Units	CoTO210	100	1,00	0,94	25%	75%	1,00	0,94	70%	30%	3%	3%	0,94
Residential - Phase 3 & Phase 4	Units	CoTO210	116	1,00	0,94	25%	75%	1,00	0,94	70%	30%	3%	3%	0,94
Office	100m ²	CoTO710	200	2,10	1,63	85%	15%	2,10	1,63	20%	80%	20%	3%	0,78
Retail	100m ²	CoTO820	200	4,01	3,50	65%	35%	22,70	19,81	50%	50%	10%	3%	0,87
Hotel*	Rooms	CoTO310	40	0,50	0,39	60%	40%	0,50	0,39	55%	45%	20%	3%	0,78
Residential - Sectional Title Phase 5	Units	CoTO232	100	0,75	0,71	25%	75%	0,75	0,71	70%	30%	3%	3%	0,94

The hotel will include a gymnasium, bar that will be used by hotel clients.

Table 2: Expected Development Trips

Total Driveway Trips						
Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
Residential - Phase 1 & Phase 2	24	71	94	66	28	94
Residential - Phase 3 & Phase 4	27	82	109	76	33	109
Office	3	0	3	1	3	3
Retail	5	2	7	20	20	40
Hotel*	9	6	16	9	7	16
Residential - Sectional Title Phase 5	18	53	71	49	21	71
Total Driveway Trips	86	214	300	221	112	333
Internal Trips						
Residential - Phase 1 & Phase 2	1	2	3	2	1	3
Residential - Phase 3 & Phase 4	1	2	3	2	1	3
Office	1	0	1	0	1	1
Retail	0	0	1	2	2	4
Hotel*	2	1	3	2	1	3
Residential - Sectional Title Phase 5	1	2	2	1	1	2
Total Internal Trips	5	8	13	10	6	16
Public Transport						
Residential - Phase 1 & Phase 2	0	0	0	0	0	0
Residential - Phase 3 & Phase 4	0	0	0	0	0	0
Office	0	0	0	0	0	0
Retail	0	0	0	0	0	0
Hotel*	0	0	0	0	0	0
Residential - Sectional Title Phase 5	0	0	0	0	0	0
Total Public Transport Trips	0	1	1	1	0	1
Net New Trips						
Residential - Phase 1 & Phase 2	23	71	94	66	28	94
Residential - Phase 3 & Phase 4	27	82	109	76	33	109
Office	3	0	3	1	3	3
Retail	5	2	7	20	20	40
Hotel*	9	6	16	9	7	16
Residential - Sectional Title Phase 5	17	53	70	49	21	71
Total Driveway Trips	84	214	298	221	112	333

Annexure C

Photos



Photo 1: Northbound View along R301 approaching Lustigan Road



Photo 2: Southbound View along R301 approaching Lustigan Road



Photo 3: Westbound view along Lustigan Road approaching the R301 (MR201)



Photo 4: Eastbound view along Schuurmansfontein Road from Access 2 location



Photo 5: Westbound view along Schuurmansfontein Road from Access 2 location



Photo 6: Eastbound view along Schuurmansfontein Road from Access 1 location



Photo 7: Westbound view along Schuurmansfontein Road from Access 1 location



Photo 8: Southbound view along R301 (MR201) from Schuurmansfontein Road



Photo 9: Southbound view along R301 (MR201) from Schuurmansfontein Road



Photo 10: Southbound View along R301 (MR201) approaching Kliprug Minor Road Roundabout

Annexure D

Queueing Analysis

Queue Analysis		170 vph	
Peak Hour Trips / Dir.			
			1 Gate
Peak hour traffic volume	=	170	veh / h
Peak hour factor	=	0,8	
Average arrival rate at peak	Q =	213	veh / h
Average service rate		10	sec / veh
	C =	360	services/h
Traffic intensity	ϕ =	0,59	
Number of channels	N =	1	gate
Traffic intensity per service channel	θ =	0,59	
Probability that n vehicles will be in the system	n	$P_{(x=n)}$	$P_{(x < n)}$
	P_0 =	0,41	0,59
	P_1 =	0,24	0,76
	P_2 =	0,14	0,86
	P_3 =	0,08	0,92
	P_4 =	0,05	0,95
	P_5 =	0,03	0,97

Annexure E

Right turn lane warrants

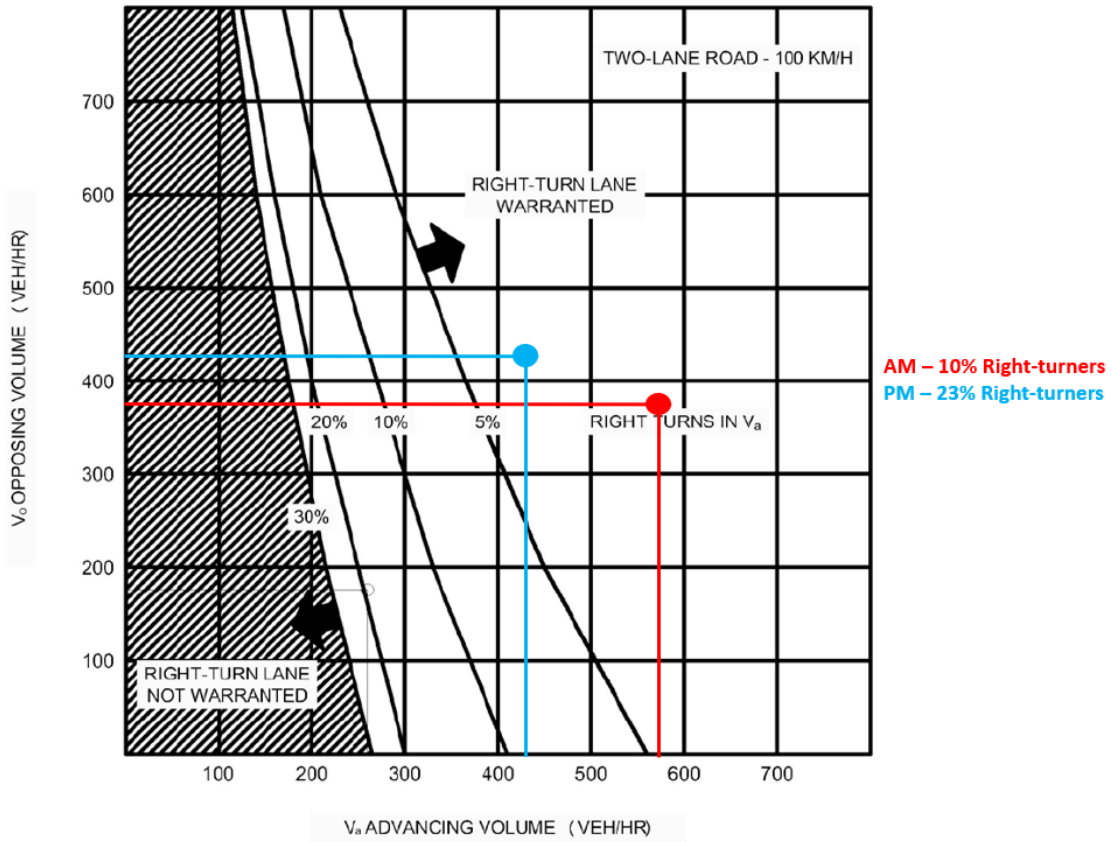


Image 1: Right turn lane warrants

(Source: Access Management Guidelines – Western Cape Government, adapted from NCHRP Report 279)

Intersection 3	V _a	V _r	% RTs	V _o
Scenario 3: TL 2027 AM	575	55	10%	370
Scenario 3: TL 2027 PM	415	95	23%	430

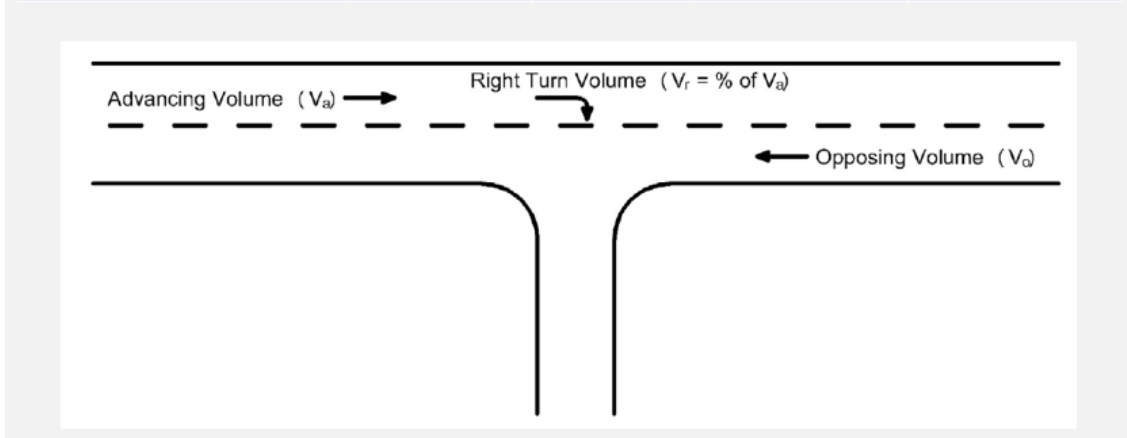


Image 2: Right turn lane warrant graph input information